SEPT. 14, 1951

HOW TO KEEP SCREENS AT PEAK EFFICIENCY . . . Page 19
HOW TO PROLONG THE LIFE OF DIGESTERS . . . Page 20

Paper TRADE JOURNAL

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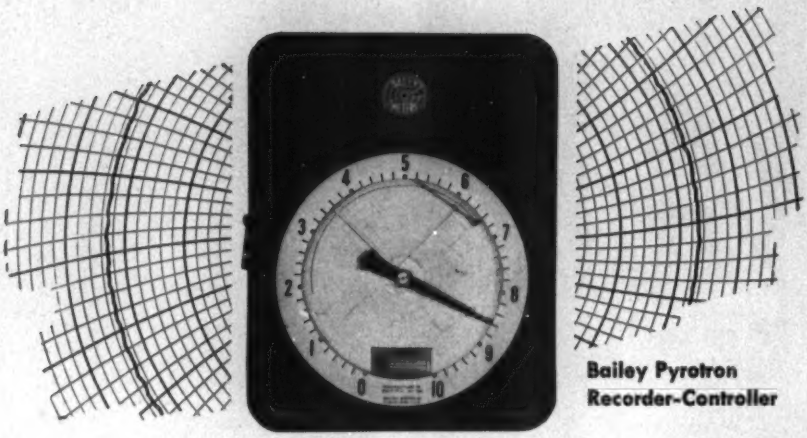

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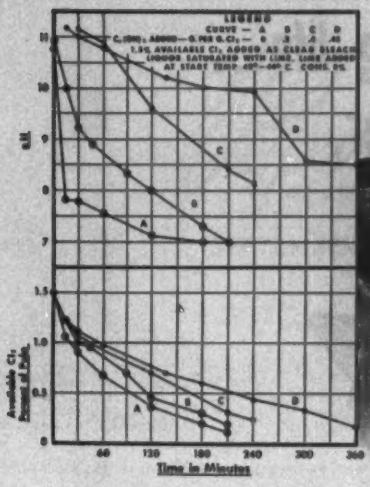
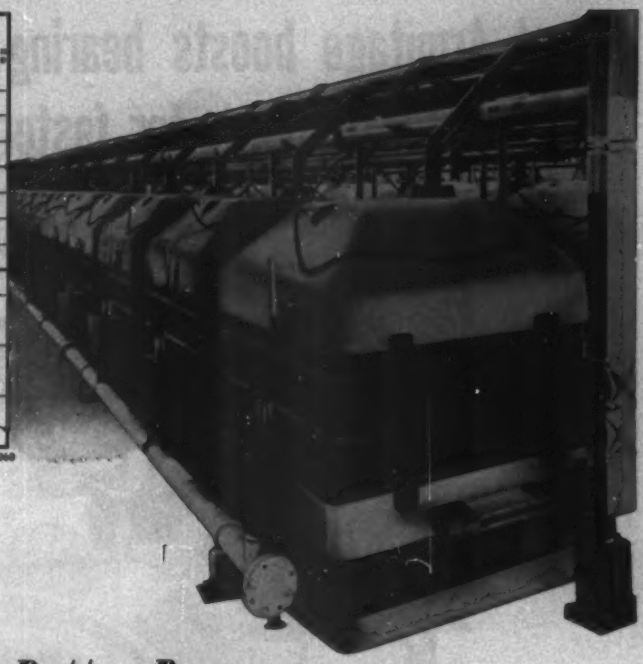


Effect of lime additions on pH and rate of chlorine consumption in a hypochlorite reaction with chlorinated sulfate pulp.



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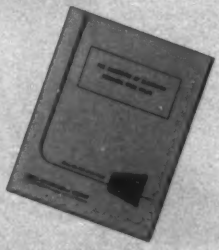

Send for This Helpful Bleaching Data

Bulletin No.	
201	Process and Equipment for Making Bleach Liquor for Use Without Settling
211	Chemistry of Bleaching Chemical Wood Pulps
214	What Do We Know About Bleaching?
236	Importance of pH and Catalysts in Bleaching Operations
242	Production and Use of Unsettled Bleach Liquor
243	Procedures and Brightness Grades in Bleaching Sulfate Pulps

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Paper TRADE JOURNAL

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NEXT WEEK

For an interesting study of the effects of various additives on the dispersion of fibers in handsheets, read "Effect of Additives on Multi fiber dispersions" by E. P. Thode, W. J. Beamesderfer and R. J. Parsons.

Number XI in our maintenance series is an article entitled "Conservation of Paper Machine Felts" by L. M. Woodsede and contains some valuable suggestions for getting longer life and better service from your felts.

REMEMBER THESE DATES

SEPT. 20: American Pulp & Paper Mill Superintendents Assn., Michigan Division, Fall Meeting at Motel Harris, Kalamazoo, Mich.

SEPT. 26-28: Alkaline Pulping Conference of the Technical Assn. of the Pulp and Paper Industry at the John Marshall Hotel, Richmond, Va.

SEPT. 28-29: American Pulp and Paper Mill Superintendents Assn., Pennsylvania-New Jersey-Delaware Division, Pocono Manor, Mt. Pocono, Pa.

OCT. 4: Salesmen's Assn. of the Paper Industry Annual Luncheon, Stevens Hotel, Chicago, Ill.

OCT. 4-5-6: National Paper Trade Assn. Convention, Stevens Hotel, Chicago, Ill.

OCT. 5: Paper & Twine Assn. dinner, Hotel Blackstone, Chicago, Ill.

OCT. 10-12: American Pulp & Paper Mill Superintendents Assn., Southern and Southeastern Div's., George Washington Hotel, Jacksonville, Fla.

OCT. 15-18: 6th Engineering Conference, Technical Assn. of Pulp and Paper Industry, General Oglethorpe Hotel, Wilmington Island, Savannah, Ga.

OCT. 29-31: National Foreign Trade Convention, Waldorf Astoria, New York City.

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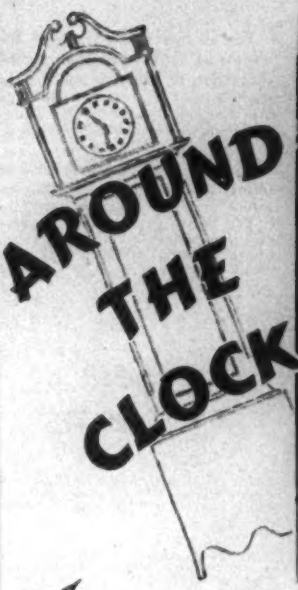
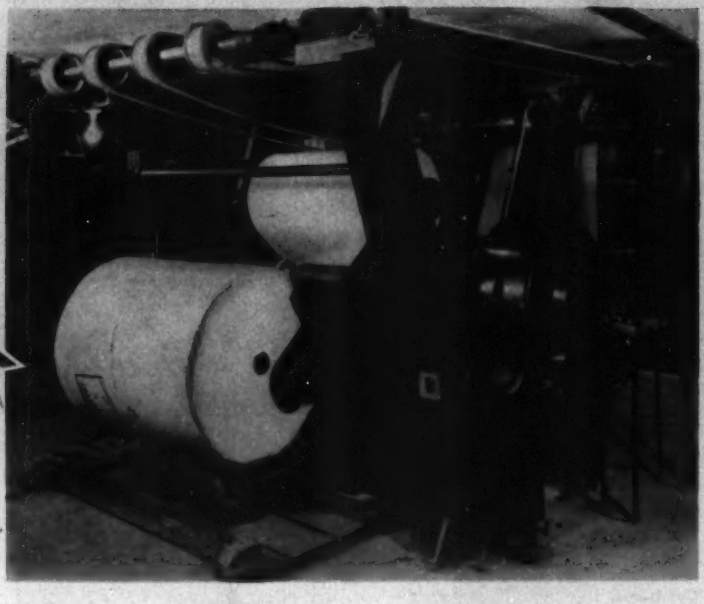
NEVER A STOP





With the Kohler Flying Paster and Flying Starter on a converting machine they zip the run thru on a non-stop schedule.

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We watched the Flying Starter especially. Without haste or effort, the operators placed an empty core in the reel. Then they rotated the reel until the fresh core was at the rewind position. Being all set, the operators pushed a button. A knife sprang up and presto! the waxed web started winding on the fresh core. No broke . . . no difference in wax deposition and finish . . . no wrinkling.

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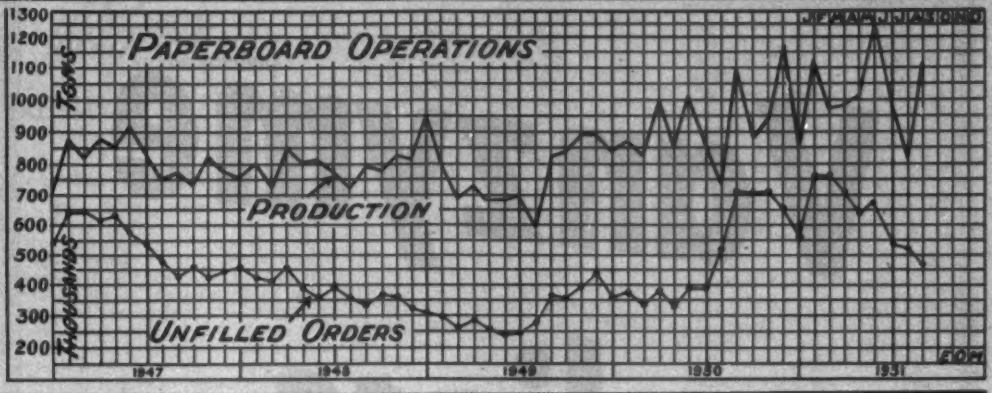

Brief of Important Figures

Source	Production	Sept. 1, '51	Aug. 4, '51	Sept. 2, '50
		WEEK ENDING		
APPA	Paper Production Percent Capacity[a]	96.8	100.3	99.2
	Unbl. Kraft Paper Production Percent	97.7	100.0	94.2
NPA	Paperboard Operating Ratio Percent Inch Hour	93	94	100
		July 1951	June 1951x	July 1950
APPA	Paper Production[a] (Except Newsprint and Building Papers) ...Tons	808,000	891,487	748,000
	New Orders ...Tons	848,000	889,173	957,000
	Unfilled Orders ...Tons	1,035,765	984,685	775,090
	Shipments ...Tons	796,000	893,075	745,000
		[b]Aug. 1951	July 1951	Aug. 1950
NPA	Paperboard Production ...Tons	1,112,731	815,547	1,130,242
	New Orders ...Tons	1,081,321	814,729	1,365,968
	Unfilled Orders ...Tons	470,841	537,591	729,058
	Our Customers Activities Index[c]	Latest Mo.[c]	Previous Mo.[c]	Year Ago[c]
FRS	Manufactures Total Index	233	233	209
	Durable Mfg. Index	277	277	238
	Nondurable Mfg. Index	197	197	184
	Chemical Products Index	301	298	258
	Mfg. Food Products Index	164	158	164
	Printing and Publishing Index	170	179	169
ODC	Magazine Advg.-Printer's Ink Index	350	355	321
	Retail Sales Combined Adjusted Index	341.6	348.9	317.9
	Drug Index	234.9	229.8	222.0
	General Merchandise Group Index	319.5	333.6	311.1
	Grocery and Combination Index	440.8	444.3	378.9
	Prices Index			
BLS	Consumers Price Index[d]	185.2	185.4	170.2
	Wholesale all Commodities[d]	181.7	182.9	157.3
	Wholesale Foods[d]	186.3	187.3	162.1
	Commodities other than Farm Products and Foods[d]	170.5	171.7	148.7
	Wholesale Pulp and Paper[d]	196.2	196.2	155.6
	Purchasing Power of Dollar, Consumers Prices[d]	54.0	53.9	58.8
	General Activity Index			
FRS	Mfg. Production-Worker Payroll	429.4	428.3	362.7
	Unemployment Compensation Initial Claims (M)	1,118	908	1,104
	Miscellaneous Carloadings-Thousands of Cars	1,937	1,582	1,845
	Electric Output (Million KW hr.)	34,966	35,136	31,608
PTJ	Average 32 P & P Common Stocks as of Sept 8	$39.53	$39.00	$32.35

[a] 1935-39=100 Unadjusted Index
[b] 1936=100
[c] New 6-7 day basis.
[d] Per Five Weeks.
[e] For details see APPA Monthly Statistical Summary—July 1951 Estimated Figures
[f] Latest Month Available on Request
[x] Revised figures

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Paper TRADE JOURNAL

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, September 12, 1951.

Market Skepticism Grows

A growing skepticism is noted in New York's paper and board markets that consumer demand is going to get a large enough spur from defense spending in the near term to take up industry output. Curtailment of mill buying of raw materials is reported, along with cutbacks of raw stocks. Some describe the paper industry as pessimistic. It is at least cautious.

Hardest factors to reconcile in general business are the depressive tendencies observed in today's markets and the renewed propaganda from Administration leaders that inflation must be fought. The confusion which results in men's minds doubtless is a positive element which adds up well in Moscow's plans for keeping us economically off balance and for destroying our capitalist economy from within. *This*, in the opinion of thinkers, is the maneuver to be watched more than the peace gestures in Korea.

Management experts who have come to recognize the Soviet strategy are advising great caution in business planning so that amassing inventories may not bear the market down while defense spending lags.

But since the rate of defense spending is and will be influenced by military feints from the Kremlin, it appears that we can count on a continual lag in the schedule.

The Washington tack appears to be to hold the line against inflation which could develop with the billions of defense spending, and to make such amendments in controls legislation as are demanded by the workings of the Democratic system to meet changing business conditions.

Market Bellwether—Paperboard—Lags

Production figures for the market's major bellwether are being closely studied for a Fall pickup. Latest report covers the week before the Labor Day week-end holiday, thus can hardly be conclusive. Next week's report, that for the week ended September 8, should show a gain in new and unfilled orders to reflect the monthly container orders. It is suggested that the weeks immediately following should prove an interesting study in trends.

However, from reports of conditions in waste paper markets, it must be concluded that a small pickup only can be expected. Pointed up is the marked weakening which last week dropped Chicago prices $5 to $25 a ton and weakened all other markets which had hoped to hold the line until October.

Paperboard Production (Tons)*

	Sept. 1 1951	Aug. 25 1951	Sept. 7 1950	Month of August
Production	216,709	225,800	229,360	1,112,731
New Orders	184,783	188,010	317,217	1,081,321
Unfilled Orders	470,481	516,856	729,058	470,841
% of Activity	93	94	100	

* Source: NPA.

The softening grew out of lagging board and tissue mill demand; from a strike in five New Jersey board mills which now has run several weeks—in itself significant of market tone; from the fact that mills are revamping inventory positions and have cut back their buying; and because of abundant offerings of unbleached kraft pulps which have so weakened the kraft waste price that old kraft paper has no price.

In New York, old corrugated is firm at $37, mill price, f.o.b. shipping point, though a few distress offerings were reported at lower. Other bulkies also are holding, though *news* is abundant. Quality packings of all grades are more available. New kraft corrugated cuts have tumbled some more to $90 (from $115/130 August 1); kraft envelopes, hard and soft white shavings are easier; manila tab cards are soft. White blank news moves slowly at $80. Mixed and white ledgers also are dropped $10. Book stock is down appreciably.

Boston notes weakening in krafts and reported $10 drops on all grades.

Philadelphia's price dips parallel those of other markets. All markets are weakened by lighter mill demand and cautious buying.

Spot Woodpulp Demand Hit

First casualty to any market easing would be in spot offerings of wood pulps. But since a ceiling prevails on all market pulps, obviously the only legitimate spot pulps can be those which are resale lots.

This market, which reflects mill offerings of higher-priced pulps that can be replaced at ceiling prices or which are unwanted because of inventory curtailments, is reported to be much easier.

For the most part, contracted tonnages are being accepted. Here and there one hears of "minor cancellations" which are generally denied by suppliers. The mills are said to be undertaking to resell unwanted tonnages themselves. Such "cancellations" or resales are not believed to result so much from cutbacks to the 95 percent consumption limit set in M-72, the woodpulp order as to the 45-day inventory restrictions set by CPR 49.

New Overseas Rollback Discussed

Against this growing letup in board and paper demand, which some observers believe is long overdue, some segments of the industry are informally discussing a further rollback in overseas pulp (buying) prices to Canadian levels. The original rollback was effected on June 30, 1951, when CPR 49 set the ceiling price of $200 for unbleached grades and $225/230 for bleacheds.

Primary argument heard against such a rollback is that the Capehart Amendment to the 1951 Defense Production Act bans a rollback.

The argument is academic in the opinion of others in the trade, since strictly speaking the CPS does not have authority to control any foreign prices. Whatever action is decided on by OPS will be subjected to counsel.

Importers React Strongly

As had been anticipated, pulp importers are not in favor of another rollback. Some see the remaining tonnages (50 percent of the original commitments) cut off from this market. Others see a cutback to 35 percent. The move is described as "untimely and foolish under present conditions," particularly for those mills who feel they must have Scandinavian grades for specialty paper production.

Finnish mills which have held to their second quarter prices of $200/225 prices, are assuring their U. S. customers that they will be shipped their full third and fourth quarter commitments—at OPS ceiling prices.

Consumer Opinions Vary

Opinions of market pulp consumers vary according to their need for overseas pulps. Until the domestic supply is more assured, grade by grade, many mills do not want to be thrown out of balance by a threat to their overseas supply.

Export Tax Question

Voiced unanimously is objection to U. S. mills virtually paying the EXPORT tax (so-called) to the Swedish Government. Were the third quarter tax of approximately $30 to be dropped from the $200 ceiling price, the Swedish price would be less than the Canadian level. It is learned that the amount of the fourth-quarter tax probably will be increased some 20 or 30 kronor, whereas the Swedish mills are known to be protesting. It doesn't make sense here in the U. S.

The equalization tax was imposed, says the Swedish Government, to stem the effect of inflated pulp prices on the domestic economy. The pulp mills, say their agents, do not expect the Socialist Government will ever return the agreed upon portion to them. Thus the premiums in pulp prices are going to the Swedish Government in dollars to support a Socialist regime.

The U. S. ceiling price is, however, important to all Scandinavian producers. It is the floor for world market prices which none wants lowered.

These are the important considerations on both sides of the question which has not yet reached formal discussion at Washington. —E.P.N.

In The Paper Industry

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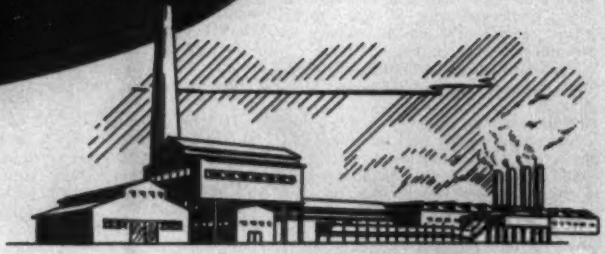

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◀ *Western Precipitation is able to give you an unbiased recommendation on your recovery requirements, for in addition to leadership in the electrical recovery field—Western Precipitation also leads in the mechanical recovery field with its widely-known* MULTICLONE *Mechanical Collectors. Western Precipitation installed the first MgO plant.*

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News of the Week

MacMillan to Double Capacity

Late in the summer of 1953 the H. R. MacMillan Export Co. Ltd. expects to have doubled the capacity of its $19 million sulphate pulp mill at Nanaimo. This would give a daily capacity of over 550 tons with a further investment of about $20 million.

At present the plant produces only bleached and unbleached sulphate pulp, but allowances for future expansions could permit diversification of pulp production.

No announcement has been made on the details of the expansion, but it is known that eight new digesters will be added to the present four. This will permit shutdowns for repair and a longer cooking period which in turn produces a better quality pulp.

Dominion Bridge will construct the new digesters and contribute to a reinforced concrete deep-sea wharf which will cost around a half million dollars. General contractor for the wharf is Dominion Construction Co. Piles cannot be driven owing to the rocky sea bottom and the strong currents which eliminate the possibility of using fill.

Water for the mill will be brought through a 50-inch wood stave pipeline, carrying 65 c.f.s. from a dam to be constructed near the headwaters of the Nanaimo River. Special wells, called Ranney Collectors, are the present source of water supply. These are sunk into the old gravel beds of Haslem Creek. The new rock-fill dam, tunnel and pipeline will cost about $2 million.

Most parts of the mill must be enlarged to handle the output of the eight new digesters. Only the wood room, with its hydraulic barker, slasher saw and chipper will remain the same. The present warehouse will be supplemented with a 250-foot storage building.

In order to recover more of the used chemicals and to use the heat in the waste liquor, a large recovery boiler from the Dorr Co. of Montreal will be installed. It will generate 120,000 pounds of steam in one hour while handling one million pounds of solids.

The steam plant will also have another VU boiler and this in turn necessitates a new smoke stack into which the two present VU boilers and the new steam boiler will be vented. The two recovery boilers will then vent into the old stack. Dominion Bridge will construct a new blow tank, larger than the present one.

High density and bleaching sections will also be doubled, and a completely new recausticizing system with lime kiln will be installed.

A new drier will be added to handle the increase in pulp production, as well as a new layboy and baling press.

Chipped sawmill waste from MacMillan mills on the Fraser River and chips from the B. C. Forest Products plant at Youbou are being used to a great extent in running the pulp mill.

The chips are trucked in from Youbou to Nanaimo in 10 unit trailers while Vancouver sawmill waste is transported by tug and barge. Chips from Youbou go into a large bin where a new type air blower will move them to chip storage. The new type blower operates by reducing the amount of air that must be moved, thus moving more chips with less power. It can move 40 units of large or small material per hour. This equipment is being constructed by the Conveyair Co. of North Vancouver. Already constructed are three extra chip storage bins.

Most of the contractors for the new expansion cannot be named at this date, as many contracts will depend on ability to obtain steel and other scarce materials.

SITROUX INSTALLS OCO SYSTEM

CLAYVILLE, N. Y. — Superfine Paper Mills, Inc., branch of Sitroux, Inc., has put its new Oco Save-All system into operation. The system will conserve valuable fiber, make water reuse possible, and practically reduce stream pollution to non-existence.

Figure 1—Oliver United and Sherbrook Machinery pulp washers with 8-foot by 14-foot cylinders are used to wash the pulp between bleaching stages at the Harmac Nanaimo mill. Capacity of the bleach plant will be doubled.

Figure 2—Exterior of the bleach plant shows sulphur storage silo on the left. Other chemicals are kept on the opposite side of building as a safety feature. Another $20 million is being invested at the new Harmac Mill.

Investigate Debarking Machine

Frank Knight, Eastern Corp., Brewer, Maine, visits Sweden for a first hand look at the new Andersson Pneumatic Debarker, at the site of the experimental installation. Left to right in photo are: D. A. Philbrook, Northeast Pulpwood Research Center, Gorham, N. H.; Frank Knight, Eastern Corp., Brewer, Maine; Gunnar Brundell, partner of inventor, and Erland Andersson, inventor.

CANADIAN MILL FOR CELANESE?

Rumors have been heard from the West Coast for some time that the interior of British Columbia is expecting a new pulp project to be set up in the Arrow Lakes region. More recently the Celanese Corp. of America's name has been linked with this development.

The provincial government with its recently instigated forest management licence policy, has been encouraging fully integrated plans which require large amounts of capital. It is said that Celanese will produce an acetate grade pulp, but must also produce newsprint and set up a sawmill and other forest industries to fully utilize the timber potential of the vast area.

The whole project is said to entail between $55 and $75 million. If the Consolidated Mining and Smelting Co.'s $30 million power project is employed, the lower figure will be indicated. The higher figure would only pertain if the recently opened Whatshan project of the provincial power commission has to be extended. The Cominco project is not scheduled for completion until 1953.

WESTMINSTER PROGRESS

OTTAWA—Westminster Paper Co., New Westminster, B.C., is making satisfactory progress on the company's $2 million expansion program. The company's new finishing room building has been complted, the wharf enlarged and construction of the new machine room is to commence shortly. Originally it had been stimated the program would be completed by about the middle of next year and this may be reasonably accomplished by that approximate time.

PRINCE GEORGE PULP MILL?

It has been heard unofficially that the interior region of British Columbia around Prince George may be considered for a pulp mill. It has been known for some time that many firms have had engineers in the area, but more recently rumor has said that New Westminster Paper Co. with its converting plant at the coast may be the principal.

Some time ago it was announced that a reserve had been applied for on the timber of the region.

Prince George has long been trying to encourage such a development, and many of the reports must be discounted. It is, however, a fact that this area is one of the last untouched virgin empires on the North American continent and that it is only a matter of time before such an industry enters the area.

TO REMOVE SULPHATE ODOR

Sponsored by Canadian pulp mills, the B. C. Research Council in Vancouver has been working to develop an economical method of removing the objectionable smell from the sulphate pulping process. It appears that good progress has been made in this direction on the West Coast through the oxydation of the solids from the wastes.

Successful experiments have been carried out with a pilot plant and the tests have been carried further on a semi-pilot plant at Bloedal, Stewart and Welch's Port Alberni mill on Vancouver Island. Solids have been eliminated to the extent of 95 percent to 100 percent, and it only remains for the process to be proven practical on a full scale.

NEW PNEUMATIC DEBARKER

Frank Knight, Eastern Corp., Brewer, Maine, got a first hand look at the new Andersson Pneumatic Debarker on his trip to Sweden February and March.

As its name implies, the trial machine invented by Erland Andersson, for the purpose of debarking trees, is reported to have shown excellent results in its ability to remove bark from 16 foot logs even when frozen. Logs are fed by powered rolls through a rotating chamber containing a row of kurling tools. These tools are so designed that they follow the contours of the log while being forced against the log with sufficient pneumatic pressure to result in the bark's being sheared from the wood without causing any appreciable fibre damage.

Observers trained to the pulp industry can also note other apparent advantages to existing equipment, such as low weight and compact size, low initial cost, one man operation, good production rates and low power consumption.

Observations of the machine's ability were made at a sawmill installation in Ludvika. but the first commercial Andersson Debarkers are now in production at Soderhamn Verkstader, A.B. in Soderhamn, Sweden. Current information is, that the Northwest Pulpwood Research Center is encouraging arrangements for manufacturing on this continent.

ARMY TO BUY KRAFT PAPER

The New York Quartermaster Procurement Agency, United States Army, will buy in the United States Kraft paper as shown below, under ECA financing for shipment abroad.

Kraft paper of the following specifications: 317.2 long tons; Weight 70-72 gms per M^2 (40-50 lbs.) in rolls. Roll width 102 cm.; Roll diameter 80-90 cm.; Core size 7 cm.

Firms interested in this procurement should *immediately* contact: The Commanding Officer, New York Quartermaster Procurement Agency. 111 East 16th street, New York, N. Y.

This procurement will be carried out in accordance with existing Department of The Army procurement procedures.

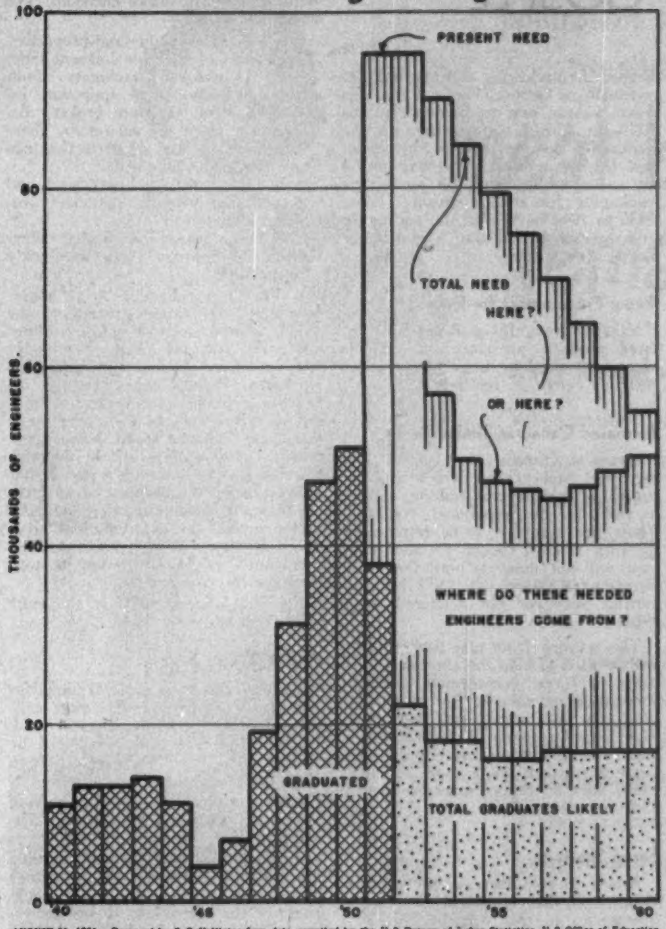
NEW PAPER MUST BE USED

BURNABY, B. C.—Newspapers have been banned in Burnaby as a wrapper for meat and fish.

The recently passed Meat and Fish By-law provides no newspaper or any printed, soiled or unclean paper shall be used as a wrapper in direct contact with any butcher meat or fish.

The by-law also calls for all poultry over five pounds in weight to be placed in a large paper bag with sufficient ventilation provided to prevent decomposition.

The Critical Shortage of Engineers



AUGUST 31, 1951 — Prepared by E. C. Holtzaw from data compiled by the U. S. Bureau of Labor Statistics, U. S. Office of Education, American Society for Engineering Education, and Engineering Manpower Commission of Engineers Joint Council.

Engineers Wanted

We are short some 50,000 young engineers this year. Our peace, our technological progress, our survival, depend on engineering.

We cannot remain listless and apathetic to this problem any more than we can to metal shortages, and production shortages. It's a problem of the paper industry just like it's a problem of oil, steel, chemicals.

There were at least 5 jobs offered to each of the graduates of Maine, Syracuse, and the Institute.

Have you tried to hire a man lately? If you have, we don't need to tell you it's tough.

If you want to progress, if the industry is to grow, if new equipment processes are to be developed, we have got to have more engineers.

Do you want to do something about it?

The National Engineering Manpower Convocation, which will do something, is to be held in Pittsburgh on September 28.

If you have not been invited, you can be, very easily. Advise us. The only requirement is that you will work on your local level and hard.

This industry is a monument to engineering achievement. Keep it from being a memorial.

U. S. IMPORTS WOODPULP

Preliminary, July, 1951

Item	Country of Origin	Short Tons
Mechanical		
Unbichd.	Canada	24,687
	Norway	127
	Finland	947
		25,761
Screenings	Canada	530
Bichd.	Canada	2,137
Chemical		
Sulfite, Unbichd.	Canada	37,259
	Sweden	11,026
	Germany	509
	Austria	117
	Finland	4,310
		53,221
Screenings	Canada	737
	Sweden	531
		1,268
Sulfite, Bichd. Rayon & Special Chem. Grades	Canada	17,092
Other	Canada	17,928
	Sweden	9,388
	Norway	480
	Finland	2,564
		30,360
Sulfate, Unbichd.	Canada	16,280
	Sweden	10,756
	Norway	371
	Finland	3,772
		31,179
Sulfate, Bichd.	Canada	35,822
	Sweden	10,200
	Norway	280
		46,302
Soda Pulp, Bichd. & Unbichd.	Canada	2,625
Totals, July	Canada	135,887
	Norway	1,258
	Finland	11,593
	Sweden	41,901
	Germany	509
	Austria	117
		211,263

NEW DIGESTER FOR B. S. & W.

Bloedel, Stewart and Welch, unbleached sulphate producer, Vancouver Island, B. C., will add a fourth digester to its Port Alberni mill. The 4700 cubic foot capacity vessel which is now under construction, will supplement the other three, permitting a longer cooking period and thus raising the pulp quality.

NEW PAPER USES

Iron-Coated Paper

Interest has been shown in an iron-coated paper used for speeding up the mounting of small cut-outs and for other copy preparation purposes. The paper, coated on one side with an iron-content material, can be held in place with magnetized material under the mounting paper, and yet moved about freely.

GOVERNMENT GOSPEL

Set-Up Box Pricing Formula

Members of the Set-Up Paper Box Industry Advisory Committee at their second meeting with OPS officials recommended that their industry be included in the coverage of a proposed regulation for converted paperboard products.

It was proposed that manufacturers price such products either at the same level as their base period prices or by the formula they employed in pricing during the base period. Base period prices would be employed by those who customarily sell according to published price lists.

Committeemen recommended that January 25 to February 24, 1951, be designated as the base period.

In pricing by formula manufacturers would compute their materials, labor and delivery costs, and apply the same margin used in the base period.

Committeemen suggested that in applying the formula for their material costs manufacturers employ either existing ceiling prices or current market prices on their materials at the time of estimating jobs. Committeemen said there might frequently be minor price fluctuations in their material costs between the time of estimating and manufacturing a job so that actual material costs would not be practical. Under ordinary circumstances these fluctuations average out. However, it was pointed out under price regulation a manufacturer, if required to use actual material costs, would be in violation if he did not reflect every decline in material costs in his prices which occurred betwen the time of estimating and finishing a job. At the same time, he could not ask his customers for higher prices to cover every increase in material costs.

No Canadian Price Control

OTTAWA—Canadian pulp and paper industry has now learned from Prime Minister St. Laurent that Canada is not going to have direct price controls for the present at least. Rumors had been spread that such price controls were coming shortly but these have been proven false.

Couch Heads Packaging Div.

WASHINGTOEN—Robert de S. Couch, General Foods, Inc., packaging research executive, was named this week as head of the Containers and Packaging Division of NPA.

The new official is on leave from General Foods Corp., where he has served as assistant manager in charge of the Government Controls department. He is also vice-president and director of Packaging Institute, New York City. From 1946 to 1951 he headed the packaging and research department of General Foods. Early this year he was sent to England by the ECA to furnish information on the packaging systems used in this country. During a part of the war period he assisted the Army in specifying packaging for combat rations. From 1936 to 1942 he headed the packaging and research activities of Riegel Paper Corp., New York.

Paper Procurement for Iceland

WASHINGTON, D.C.—Paper and related products amounting to $20,000 were authorized by ECA for procurement on behalf of Iceland.

Increased Canadian Timber Rates

OTTAWA—Ontario Government has increased timber rates which are expected to add several million dollars a year to the provincial treasury. These new rates are to be retroactive to April 1, 1951, though the new revenue will not show up until the fiscal year ending March 31, 1953 because cutting bills are not rendered until 1952.

The revenue from new timber rates will be used to help the expanded program of forest management and reforestation in Ontario. For pulpwood, the rates are balsam and jack pine, $1.40 a cord as compared with 95 cents and 70 cents respectively. Poplar and other hardwoods $1 a cord as compared with 50 cents. Spruce is set at $2.80 as against $1.70.

Scrap Shortage

Aimed to help increase the current dangerously low iron and steel scrap inventories in this country, the National Production Authority, U. S. Department of Commerce, is distributing a booklet, "Scrap for Steel Mills and Foundries for Defense," to more than 200,000 executives of business, industry and trade associations.

Following is the program outlined in the booklet for the recovery of dormant scrap:

1. Go after dormant scrap—Start an emergency inspection and inventory of all heavy steel, whether machines, equipment, beams, or plates. Dispose of everything you possibly can to a scrap dealer.

2. Appoint someone with authority—It is extremely important that the top executive of every industrial and commercial establishment, large and small, appoint someone with authority to clean out dormant scrap and to be responsible for a continuous good-housekeeping job.

3. Salvage committee—In large industrial firms the chief executive should appoint a salvage committee with authority to make decisions. The committee should—

a. search all plants and properties, regardless of size, for dormant scrap such as obsolete machinery, tools, jigs, dies, and other equipment, including items that are broken, dismantled, worn beyond repair, abandoned, or in need of parts that can no longer be obtained;

b. survey potential wrecking and dismantling projects that will produce scrap;

c. make disposition of all production and dormant scrap as quickly as possible.

4. Put scrap collection on a "housekeeping" basis—Besides increasing the supply of iron and steel scrap, continuous scrap recovery from questionable old standbys, obsolete machines and equipment reduces taxes through inventory writeoff, improves safety conditions, gives lowered insurance rates, and clears valuable space. Make it the personal responsibility of the committee chairman to initiate a program that will clean out the dormant scrap from the plant. It is suggested that the committee make surveys not less than every 30 days. Make your organized permanent salvage program a top-management responsibility.

ED NOTE—Scrap metal is the most critical shortage we have.

Export Ceiling Price

An amendment to CPR 61 simplifying the determination of export ceiling prices and reducing clerical work in this connection was announced by OPS.

Under it the producer-exporter is given an alternative domestic ceiling price to be used in computing his ceiling price for export sales.

The amendment, OPS said, permits the producer exporter to use either his domestic ceiling price to a foreign buyer of the same class, or his domestic ceiling price to his largest class of domestic purchaser.

OPS further said the amendment makes it possible for exporters who formerly determined their export sales by applying a markup over the price shown in their published lists, as determined for various classes of domestic purchasers, to continue this practice.

Effective date of the amendment was August 28, 1951.

Canadian Exports

OTTAWA—There has been a sharp increase in the value of woodpulp exports from Canada, rising to $32,431,000 during June this year as compared with only $18,126,000 in June a year ago, Canadian Government announces, adding that such exports of woodpulp reached a cumulative total of $163,360,000 during the first six months of 1951 as against only $91,989,000 in the corresponding period of 1950.

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no sogginess...

meat board remains firm

when treated with Cyanamid ALWAX* Sizes

When fortified with Cyanamid's ALWAX sizes, meat board acquires *controlled* absorbency, with no danger of sogginess. And meat containers for frozen foods remain firm even after they and their frozen contents have been thawed.

A high degree of lactic acid resistance makes boards sized with ALWAX sizes ideal for the dairy field. Among the working properties inherent in papers sized with ALWAX sizes are better folding, crimping, scoring and creasing qualities.

There are many other processing advantages to be gained from the use of specific ALWAX sizes to meet particular needs. Your Cyanamid representative will be glad to tell you about them. Call him in today, and send for our booklet "Quality Advantages Gained With ALWAX and WAXINE® Sizes."

ALWAX* Sizes • WAXINE® Sizes • Resin Size • PAREZ® Resins AZITE® 900 Liquefier • Synthetic Resins • Casein • Sulfonated Oils Fillers • Defoamers • Soda Ash • Caustic Soda • Salt Cake • Acids Clays • AEROSOL® Wetting Agents • CALMICRO® Calcium Carbonate • Aluminum Sulfate • Sodium Phospho Aluminate. *Trade-mark

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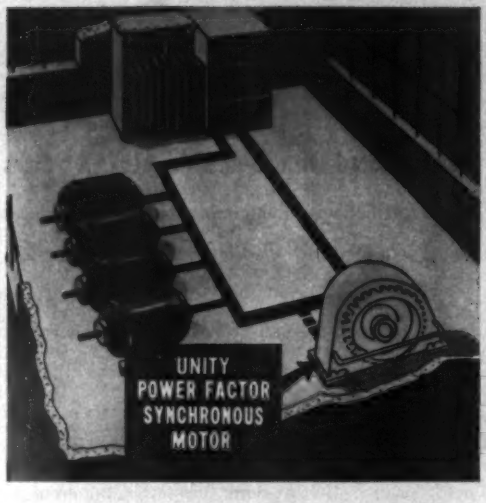

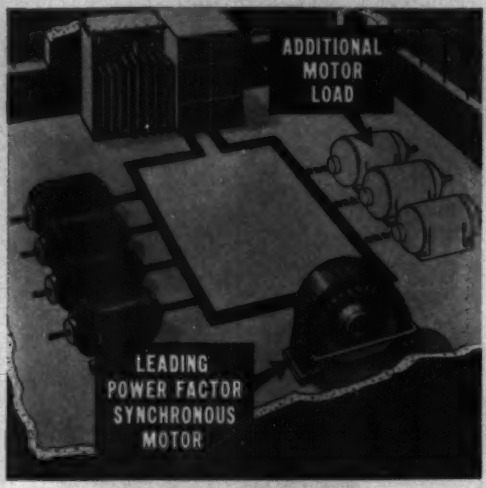

If your plant power system is loaded close to full capacity and you have a place where a large constant-speed motor can be used, you may be able to install a *unity power-factor* synchronous motor without increasing the kva load on your system.

Or, if your power system is already overloaded, then a *leading power-factor* synchronous motor can actually supply kvars to your system while performing its usual drive duties. Then you can often install additional inductive apparatus to an existing system without fear of overloading feeder lines.

If you are planning plant expansion or you need more motors and/or suspect power system overloading, contact the nearest G-E sales engineer. He'll help you survey your system, and help you determine the type of synchronous motor you need—should this be one answer to your power system problems. *General Electric Company, Schenectady, N.Y.*

NEW! A Helpful Training Course on Motors!

Everyone concerned with technical training problems will want this new G-E Motor Selection and Application Course. Consists of 9 short, easily understood lessons. Complete kit—slide films, review booklets and instructor's manual—$100. Call or write your nearest G-E sales office, or send for free copy of 96-page instructor's manual.

Look at the scope of this Course

1. Fundamentals of Motors
2. Types of Motors
3. Fundamentals of Selection
4. A-c Induction Motors
5. Single-phase Motors
6. D-c Motors
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8. Adjustable-speed Drives
9. Gear Motors

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Control, too, will protect your system—G-E Limitamp high-voltage control provides ample interrupting capacity, protection for operating personnel, good appearance, and compactness. Here it controls and protects a 350-hp G-E synchronous motor.

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in all types of industries where their efficiency, low first cost, and reliability make them exceedingly popular.

Check power factor on *individual* circuits—easily, quickly—with new G-E hook-on power-factor meter. This portable instrument hooks around the line—no cutting of conductors, no costly shutdowns to make power checks. You can accurately locate those circuits where corrective action is needed.

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( ) GEA-5469—G-E Testing Instruments
( ) GEZ-310—Motor Training Course Instructor's Manual

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However, a surprising decline in the value of newsprint exports is reported by officials here, indicating that such newsprint shipments out of the country dropped to $39,214,000 during June this year as compared with $41,404,000 in June last year, though the cumulative value of such shipments increased to $248,502,000 during the first six months of 1951 as against $235,464,000 in the same period of 1950. Exports of other paper advanced to $3,058,000 in June this year as against $1,204,000 in June a year ago and totalled $17,426,000 in first half of this year compared with $7,347,000 a year ago in this period.

The upward trend in the value of paper imports into Canada is still continuing, report discloses, indicating that paper imports advanced to $2,610,000 during June this year as against merely $1,922,000 in same month a year ago and totalled $17,049,000 in first six months of this year as compared with $10,973,000 in this period a year ago.

Canadian Car Loadings

OTTAWA—Car loadings of woodpulp and paper on the Canadian railways from the beginning of 1951 until August 25 increased to 163,939 cars compared with 147,724 cars in the similar period of 1950, according to latest nationwide survey by Canadian Government.

Earnings of Canadian Mills

OTTAWA—Higher corporation taxes have had the effect of generally holding earnings down to approximately the same level as the corresponding period last year and below the apparent earnings of the final six months of 1951, according to reports of six newsprint companies for the first six months of this year, states Jones, Heward & Co., in its review.

The increase of $10 a ton in the price of newsprint which came into effect on July 1 this year should result in slightly higher earnings for the current six months despite the increase in wage rates, the review points out.

Raise for Canadian Woodsmen

OTTAWA—A new contract has been signed between 19 Ontario pulp and paper companies and approximately 20,000 bush workers, with one of the conditions calling for wage boosts averaging 14½% in take-home pay as well as a union shop contract. This new agreement was signed by the Lumber and Sawmill Workers' Union as well as the United Brotherhood of Carpenters and Joiners of America (AFL) and the following companies:

Abitibi Power and Paper Co., Ltd.; Brompton Pulp and Paper Co., Ltd.; Driftwood Lands and Timber Ltd.; Great Lakes Paper Co., Ltd.; Hammermill Paper Co.; K.V.P. Co., Ltd.; Marathon Paper Mills of Canada; Newaygo Timber Co.; Nipigon Lake Timber Co.; Northern Paper Mills; Ontario-Minnesota Pulp and Paper Co.; Ripco Timber Co.; Oscar Styffe Ltd.; E. V. Woollings; Spruce Falls Power and Paper Co.; Long Lac Pulp and Paper Co.; Upper Canada Timber Co.

It is a one-year agreement, becoming effective September 1. New average hourly rate is $1.35 compared with $1.21 in the old agreement and the average hourly rate for workers paid on a piece-work basis will be $1.56 as against $1.29, with general laborers getting an increase to $9.09 from $8.03 a day. It is also provided for maintenance of membership and a voluntary revocable checkoff. Vacation pay will be 2% of annual earnings, allowing one week vacation for the first five years, two weeks after that and three weeks after 15 years' service. A year's service is 200 accumulative days' employment in any one year, according to the new agreement.

Chemwood Defaults

It is reported that Reconstruction Finance Corporation records showed recently that a paper-making enterprise organized by James H. R. Cromwell, former U.S. Minister to Canada, is in default on a $45,000 loan.

The company, established in August, 1948, is the Chemwood Corp., which operated in a pilot plant at Manchester, N. H., in the de-inking and reclaiming of used wax paper.

A number of members of Congress were among the investors in the short-lived enterprise, which attempted in 1949 to obtain an additional RFC loan of $225,000.

The application was rejected after James O. Hoover, RFC examiner, found the company was not solvent.

RFC examiner reports said that Cromwell, who has authored a number of economic works, including a book titled "In Defense of Capitalism," lacked technical experience in the papermaking field.

It was for this and other reasons that a second loan application for $225,000 was turned down, the RFC said.

Prices—Fire—Weather

If it is not one problem, it's another! This time it's wood and pulp prices, forest fires, and drought.

No sooner are the ceiling prices on pulp established, and the set-aside orders digested, but the report is spread that the Scandanavian pulp ceilings will be rolled back to those current for the Canadians. Perhaps this will eliminate the Swedish Export Tax on Pulp, a levy obnoxious to both consumer and producer of Swedish pulp.

While changing ceilings, why not raise the domestic price so only one ceiling level will prevail, instead of 2 or 3 as at present.

Then there's the wood situation! There has been wide publicity on the extreme fire hazard and large number of fires on the West Coast. Right when the demand for pulp and wood is at its all-time high, *nature turns against us.* As a result, large timber areas are closed to operations, right in the middle of the logging season. Consequently, *pulpwood and timber inventories cannot be built up to the required levels.*

As if this was not disastrous enough from a supply standpoint, timber prices on the West Coast are rapidly being bid out of sight for the remaining supply.

As we understand it, O.P.S. has not gotten around to setting a log or pulpwood ceiling for the West Coast Area. Yet the woodpulp prices are frozen. Further, to add to the complication, it is reported that Canadians are active in the log markets in Washington and Oregon. They, of course, can pay more for wood because the ceilings on Canadian woodpulp sold in the U. S. are higher than those for the domestic pulps.

While it may be too late to correct all of the damage done so far, *the problem can be eased by prompt action.*

It would seem that ceilings might be imposed on log prices or an adjustment might be allowed the West Coast pulp mills to compensate for increased log costs because of lack of controls. And, secondly, an emergency export ban on wood could be put into operation until the weather behaves.

If nothing is done, or if it is done too slowly, converter paper mills will *suffer further cutbacks in their market pulp supply.*

Come on O.P.S. and N.P.A. it's your problem, lets see you solve it—but *Fast,* before it is further compounded.

Henry J. Percy

MAINTENANCE—X OF SERIES

How to Keep Your Vibrating Screens at Peak Efficiency

B. D. Warren[1]

Bird Jonsson screens are now extensively employed for knotting and screening of all grades of pulp, equipped with perforate plates for knotting and coarse screening and with slotted plates for fine screening.

Bird Machine Co., builders of the Jonsson screen, make the following recommendations for their operation and care in order that these screens meet their full share of the responsibility for maintaining maximum output of uniformly good pulp.

Operation

Before starting up or shutting down the Jonsson screen see that the vat is filled with stock or water. This controls vibration and assures smooth starting and stopping. When starting up adjust weir so the level of the stock comes to about the level of the discharge end of the screen plate.

The springhangers are adjusted for the correct tension and should not be changed without checking with us. The amplitude of vibration should be the same in each of the four corners and this is readily checked by holding a piece of paper against the screen trough and marking the vibration movement with a firmly held pencil.

Consistency of Feed

Stock should be fed to screen at uniform consistency. For knotting the best consistency is 1.0 percent to 1.5 percent depending on the kind of pulp. For fine screening the best consistency is .5 percent to .8 percent.

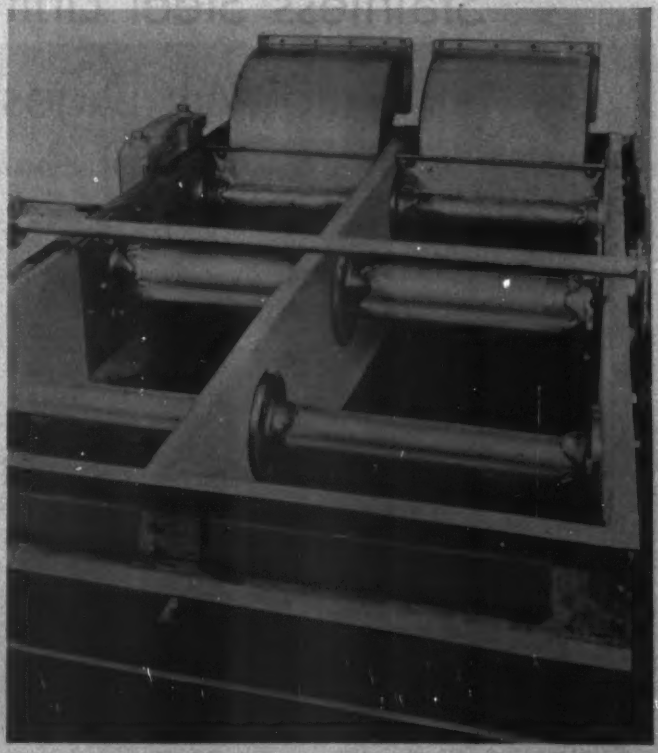
Cleaning

Use steam for cleaning screen plates when required. This is particularly desirable when slotted plates are employed.

Lubrication

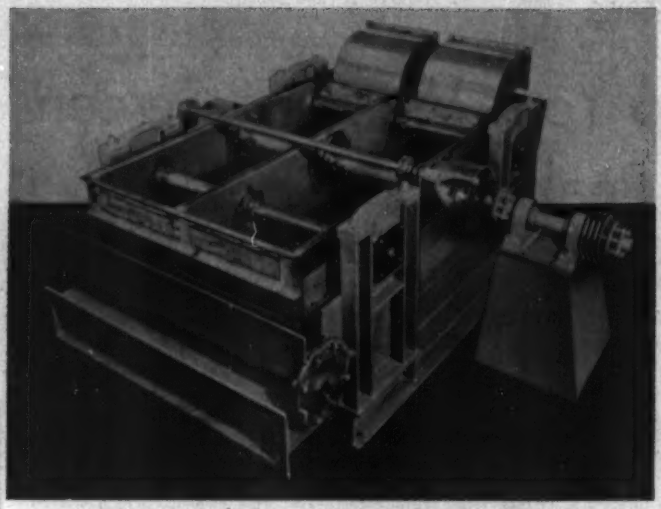
The housings of the SKF spherical roller bearings are packed with Lubrico M-3 special grease, manufactured by Master Lubricants Co., Philadelphia. This is recommended for continued use as it forms a rust-preventing emulsion in the presence of water which can easily be drained from the housing through a plug provided in the bearing cap. The bayonet type Alemite fitting on the bearing housing should receive grease once a week. Greasing method recommended is as follows:

1. Shut down the screen after it has run long enough to warm the bearings.
2. Remove the ¼" drain connection and clean out any hardened grease in the drain hole.
3. Start up screen with plug out and allow dirty grease to be forced out.
4. Stop screen and apply grease while rotating the shaft by hand. This



Bird Jonsson Screen showing specially shaped Perforate Screen Plates used for Knotting, Coarse Screening and Ahead of Brown Stock Washers

[1] Assistant Sales Mgr., Sales Engineering Dept., Bird Machine Co.



Bird Jonsson Screen for Pulp showing the new type Screen Supports, Neoprene mounted for quiet operations with a minimum of Vibration transmitted to the Foundation.

will allow the clean grease to be forced through the rollers, assuring adequate supply.

5. Replace the drain plug and start up the screen. The grease will be relieved through the flinger. If it isn't, shut down and add grease until it does appear around the flinger when running.

The pillow blocks on the jack shaft assembly are also equipped with Alemite fittings. Apply a small amount of the same grease at the time the main bearings are lubricated.

Jonsson screens are of simple, rugged construction. They are capable of years of trouble-free operation if the above simple instructions are followed.

Stainless Steel Lining of a Pulp Mill Digester*

S. C. Johnson[1] and N. J. Gibson[2]

Summary

Digesters of mild steel used for sulphate digestion of eucalypts were showing serious corrosion so that their life would have been only 8 to 10 years. One of them, indirectly heated and with a capacity of 1,350 cu. ft. was lined, while in place and after several years' service, with austenitic stainless steel (Weldanka). The major part of the internal surface was lined with 12 gauge cold-rolled annealed and pickled metal in the form of strips 4 in. wide. The first two welding runs joined the strip to the shell and the third run filled the gap and covered the diluted weld-metal of the first two runs. The strainer screen plates and liquor inlet pipe and spray were made of the same grades of stainless steel. After 15 months' service the lining was in excellent condition.

Introduction

During August, 1939, Australian Paper Manufacturers Limited commenced the operation of its eucalypt sulphate pulp mill at Maryvale, Victoria.

At that time three paper pulp digesters made of mild steel were put into operation. A fourth digester was added in 1941 and a fifth and sixth in 1943. The first four were of exactly the same dimensions; the fifth and sixth were somewhat shorter, and of a capacity of 1,350 cu. ft., the leading dimensions of the latter being 9 ft. 6 in. internal diameter and 26 ft. 5 in. overall height. The shell thicknesses of all six were similar, i.e., the top cone ¾ in. thick, the body 1 in., and the bottom cone ⅞ in. The design provided for fusion butt welding.

After some four years of operation it became apparent that the corrosion rates of all six vessels were so high that replacement would be required after 8 to 10 years' life. A committee was set up to study this and other corrosion problems of the mill.

The committee considered the matter from two points of view:—

(a) what could be done to reduce the rate of corrosion?

(b) what methods of protection of the internal surfaces could be employed?

Some experimental work was instituted by Mr. P. F. Thompson (a member of the committee) to provide additional evidence on the reasons for corrosion, but before these can be discussed it is necessary to set out a brief account of the conditions of operation.

The sulphate process involves the simultaneous filling of a digester with wood chips (eucalypt wood being used), and with white and black liquors in the ratio of approximately 2 to 1 by volume. Typical analyses of these liquors are shown in *Table I.*

TABLE I
ANALYSIS OF LIQUORS

		Black Liquor	White Liquor
Na_2SO_3	%	5.34	1.34
Na_2S	%	2.44	2.86
$Na_2S_2O_3$	%	0.475	0.63
Na_2CO_3	%	0.475	3.52
$Na_2O + K_2O$ combined with organic material	%	2.33	...
NaOH	%	...	7.45
NaCl	%	0.41	0.21

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* Presented at the Fourth General Conference of the Australian Pulp & Paper Industry Technical Assn.

[1] Deputy Supply Engineer, Australian Paper Manufacturers Ltd.

[2] Proprietor, F. Schmitt & Son.

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After charging, the vessel is closed and brought to a pressure of from 80 to 90 lb./sq. in. by circulating the liquors through an external heat exchanger.

Pressure is maintained for approximately 1½ hours and the whole charge is then blown by opening the blow valve into a blow tank. The cycle takes about four hours and is repeated at least for 5½ days per week and sometimes continuously for 2 or 3 weeks.

P. F. Thompson's experiments included the determination of electrode potentials of a number of ferrous metals in black and white liquors.

From experimental work carried out it was fairly clearly established that the major influence contributing to corrosion of digesters was oxygen dissolved in the cooking liquors during the early stages of the cook, the oxygen being introduced as entrapped air with the chips. This fact was established for black liquor by laboratory experiment and, for white liquor, by observation.

Electro-potential measurements in black liquor showed that a potential difference of 0.43 volt developed between two identical cast iron electrodes, one being aerated and the other not. From this work the committee agreed that two steps should be taken to reduce the corrosion rate. The first was that all digesters should be left clean and empty during shut down times, instead of being left full of eucalypt chips as previously practiced. The second was the introduction of a continuous relief of gases during the early stages of cooking to reduce the amount and time of presence of oxygen in the initial stages of the cycle.

It was found later that these two steps had had some beneficial effect.

Many methods and materials for lining digester internal surfaces were considered. The suggestions finally resolved themselves into two possibilities. One was to line with mild steel plates and the other with stainless steel. Both methods were ultimately tried. Mild steel lining did not prove successful, as shown by White *(1)*.

The field lining of a mild steel vessel with stainless steel offered a possibility of a permanent solution to the difficulty. However, industrial experience in Australia of this type of work was very limited and a programme of study and corrosion testing was therefore instituted.

Investigations for Design

From surveys of the literature two methods of stainless steel lining appeared to be possible; one, the plug or spot welding method, and the other, strip lining.

The plug welding method was taken up with an American contractor who offered to supply a new vessel lined in this manner but would not undertake the field lining of an existing vessel. He also kindly provided some very useful information which was later used to advantage, viz., a paper by Hoyt and Scheil *(2)*.

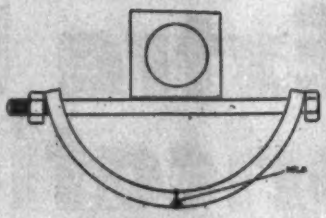

Figure 1—Stainless Steel Stress Corrosion Test Piece.

It so happened that a copy of the United States Steel Corporation's publication—"Stainless and Heat Resisting Steels for the Petroleum Industry"—was made available at the time when the matter of stainless steel lining was becoming of interest. We are indebted to this publication in no small degree. At the same time the problem was also under discussion with the contractors who later lined one vessel with stainless steel. The closest co-operation was maintained with this firm until the project was completed.

A study of the United States Steel Corporation's publication and other accounts of the linings of pressure vessels indicated that stainless steel strip 4 in. wide by 0.10 in. thick welded to digester walls in lengths of 4 to 5 ft. by three runs of weld should give a suitable means of overcoming the problem, but the type of stainless steel used up to that time was mainly A.I.S.I. 410 of composition 13 percent chromium, low carbon. The difficulty was to prove the method beyond reasonable doubt using austenitic stainless with its high co-efficient of thermal expansion — 50 percent above that of mild steel.

The fact that 18/8 stainless steel impellers of circulating pumps, which circulated cooking liquors through indirect heaters connected to each digester, had given trouble-free service for many years provided some evidence that this type should give long service as a lining where resistance to corrosion and erosion in the presence of these liquors was required.

The contractors recommended Weldanka stainless steel made by Brown Bayley's Ltd. of Sheffield, England, and Stainweld B electrodes made by the Lincoln Electric Co. (Aust.) Pty. Ltd., containing 25 percent chromium, 12 percent nickel. The electrodes offered ample margin for dilution by mild steel.

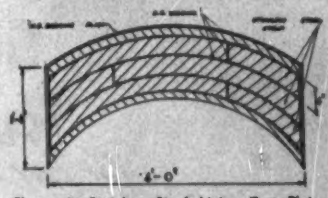

Figure 2—Stainless Steel Lining Test Plate.

Specimens, each 1½ in. x 3 in. x 10 gauge Weldanka, were welded across the middle with Lincoln Stainweld B electrodes and ground flat; one set of duplicate specimens was left with a rough finish, and the other was polished. These were placed in a digester liquor heater for approximately three months. For purpose of comparison, some mild steel specimens were also placed in the digester liquor heater. Each specimen was insulated from the next and from the supporting rod by means of rubber washers. The results are shown in *Table II*. It was noted on examination of the stainless steel specimens that the areas covered by the rubber insulators were somewhat corroded, while the remaining areas showed very slight attack. This was thought to be partly due to the sulphur in the rubber, and partly due to differential aeration.

TABLE II
CORROSION TESTS IN DIGESTER LIQUOR HEATER

	Loss of Weight g./sq. m./24 hr.	Penetration in./yr.
Mild Steel	3.8	0.007
	4.1	0.008
Weldanka, welded and not polished	0.32	0.0006
	0.36	0.0007
Weldanka, welded and polished	0.27	0.0005
	0.26	0.0005

Stainless steel specimens, some welded across the middle and others unwelded, were made from 10 gauge material by cold bending strips ⅜ in. wide around a 3 in. diameter bar. They were then stressed to give an extreme fibre stress of 35,000 lb./sq. in. minimum at the middle of the bend. The method used is described by Hoyt and Schiel *(2)*. *Figure 1* illustrates a typical specimen.

TABLE III
CORROSION TESTS IN DIGESTER

	Loss of Weight g./sq. m./24 hr.	Penetration in./yr.
Top of Digester		
Unwelded	0.21	0.0004
Welded	0.22	0.0004
Bottom of Digester		
Unwelded	0.20	0.0004
Welded	0.21	0.0004

Two stressed specimens, one welded and one unwelded, were placed at the top of a digester, and a similar pair was placed at the bottom. After one month's exposure, they were removed, re-weighed, examined and bent double. No sign of intergranular corrosion with either the welded or the unwelded specimens could be detected. The degree of corrosion found is given in *Table III*. Similar stress corrosion

tests were carried out in boiling Strauss solution. After exposure for 200 hours and bending double in the cold, no sign of intergranular corrosion could be detected.

At this stage it was thought that enough was known to fix upon the method of applying the lining. Accordingly, a test plate was made to demonstrate the suitability of the method proposed. A ⅜ in. thick mild steel plate, 16 in. wide and 4 ft. long was bent to the radius of the cylindrical portion of the digester, then sand-blasted on the concave surface and covered with stainless steel strips using mainly three-run welds. Welding was done with the plate standing in positions to give vertical, horizontal and overhead welding; in other words, to cover every weld position to be encountered in full scale lining. The plate was then tack welded into a digester. *Figure 2* outlines the welding of the strip to this test plate.

The test plate was removed from the digester after 20 months' exposure. On removal, holes were drilled through the mild steel backing plate behind three of the test strips. A pressure of 90 lb./sq. in. of ammonia was applied and no trace of leakage could be found.

Beyond a slight etching of the stainless steel strips on the surface presented to the cooking liquors, no corrosion of the stainless steel could be detected. Macro- and micro-examination of weld strip and parent metal failed to reveal any cracking or weld decay. The analyses of two different heats of stainless steel used in making up the test plate were as follows:

Carbon	%	0.10	0.08
Manganese	%	0.48	0.40
Chromium	%	17.8	17.6
Nickel	%	12.2	11.6
Silicon	%	1.00	1.08
Sulphur	%	0.010	0.022
Phosphorus	%	0.020	0.018

Limiting Stresses

As it was considered that the most likely cause of failure of a lined digester would be stress-corrosion cracking adjacent to welding, an approximation to the stress in the strips under working conditions was calculated. The calculation allowed for:

(a) the difference between the coefficient of expansion of mild steel and austenitic stainless, i.e., 50 percent in heating from the normal temperature to that equivalent to 90 lb./sq. in. of steam, the working pressure, and

(b) the expansion and extension of digester shell due to the stress brought about by working pressure.

The resultant maximum compression stress in the lining was approximately equal to 12 tons/sq. in. without making allowance for the fact that the strip would be applied under initial tension due to welding stresses. The fluctuating stress was well within the figures

Figure 3—Macro-Section of Lining Weld. A—Parent Mild Steel Plate; B—Stainless Steel Strip Lining; C—First Weld Run; D—Second Weld Run; E—Final Weld Run.

for corrosion fatigue limit published for the type of steel under similar or more severe conditions. The number of cycles of stress per annum was approximately 1,800, almost negligible for considerations of fatigue.

Preparation for Lining

Strip was available in a number of conditions. It was decided to order the material cold-rolled, annealed and pickled, to give the best compromise between softness for manipulation and surface finish.

After laying-off for field lining the digester was cleaned thoroughly, boiled out with fresh water. All necessary welding repairs were done to the satisfaction of those concerned including the boiler inspectors, and the welds and projections were ground flat. All the internal surfaces were then shot-blasted.

The strip delivered for lining was selected by the makers for this application but was first checked by testing in Strauss solution under stress as previously described. No fault could be found with it. Chemical analysis of this material advised by the makers was as follows:

Carbon	%	0.12
Manganese	%	0.35
Chromium	%	18.8
Nickel	%	10.5
Silicon	%	1.43
Sulphur	%	0.028
Phosphorus	%	0.019
Titanium	%	0.58

Lining of Digester

The contractors had made a complete drawing of the interior of the shell showing especially the position of all mild steel welds. This was used in the developmental work to prevent as far as possible the stainless steel welding from coinciding with any mild steel welds. The main intention was to avoid any porosity and irregularities at the mild steel welds that might cause porosity in the stainless steel welds. This eventually proved to be a very satisfactory procedure. The accuracy of these drawings permitted them to fabricate all strips and components at their works and, with only some minor adjustments on the site, enabled the actual lining to proceed continuously with the minimum of interruption.

For lining procedure and layout the surface was developed into nine sections. The bottom and top frustrums comprised four sections each and the vertical sides one section. In addition, all the internal fittings were then listed under their respective name and part number.

It should be borne in mind that while this paper deals with the application of an arc welded austenitic stainless steel lining by one of the strip methods to an existing digester *in situ*, the procedure as a whole is applicable to new digesters under shop fabrication.

The amount of internal working equipment was at all times cut to a minimum to allow freedom of movement by the operators and comprised mainly one wooden staging approximately 9 ft. 2 in. diameter with a 2 ft. square opening in the center to allow a ladder to pass through. This staging was lifted by a winch to the desired working position and locked by four sets of wooden wedges to the side of the vessel. Only hand tools that were in immediate use were permitted on this staging, all other tools and equipment, such as work bench, hand shears, "Hicycle" convertor, welding machines and locker were assembled at the head of the digester and together with working space occupied only 100 sq. ft.

Method of Lining

The principal method of lining adopted was to weld lengths of strip stainless steel 4 in. wide to the inside surfaces. The procedure for joining to the shell is shown in *Figure 3*.

Having been thoroughly cleaned before leaving the works, the strip was first fitted to the shell by tack welding every three inches along both sides, and the tack was then ground down with the "Hicycle" machine to ensure pore free runs. An alternating system of welding the first laps followed, which enabled a second operator to inspect each weld thoroughly and clean away slag while at the same time welding heat was dissipated before applying an adjacent run of metal thus eliminating possible cracks resulting from contraction. The gaps between the strip varied according to the thickness of strip used, but in all cases the first two runs securely tied the strips to the mild steel shell while at the same time they met in the middle. The third lead was deposited in the center and fused into the diluted 25/12 weld metal thus decreasing the dilution of the surface weld metal. Strips in the cones were placed vertically and strips in the cylindrical positions circumferentially.

Choice of Electrodes

The electrodes employed for the welding, with the composition 25 percent Cr, 12 percent Ni and stabilized with columbium, were preferred by the contractors to the 25 per cent Cr, 20 percent Ni type which at first was con-

sidered for use against weld dilution, since this type is subject to hot cracking in the weld metal during deposition, and it was considered that the 25/12 type would be preferable in view of the welding methods adopted. It was interesting to note that at the completion of the lining tests not a single crack was recorded in the whole of the 1½ running miles of welds. The warm conditions that prevailed at the site during the autumn and winter months when this lining operation was carried out were sufficient to keep what electrodes were exposed for use in a dry state, so that it was unnecessary to provide special means of drying them. Dry electrodes help to keep porosity and pin holes to a minimum.

Welding Machines

The welding equipment used throughout was Lincoln 150 amp. and 200 amp. d.c. welders. The capacity of the latter for the actual lining process itself was far in excess of the requirements, but was used, nevertheless, to ensure smooth and continuous output when working under conditions where long weld leads were necessary and where the input voltage fluctuated as much as one might expect in a paper mill.

Details of Lining Sections

The detailed procedure used in lining each section will now be described:

Section No. 1.—This section comprised the bottom 12 in. of the cast mild steel conical outlet section of the digester. It was 36¾ in. inside diameter at the top. The opening at the bottom was 8½ in. diameter and 1 ft. 10 in. deep with an inwards radius of 1 ft. 11¾ in. at the sides. Lining of this small section was done with four staves, 12 in. long by ¼ in. thick, dressed to shape and annealed and polished before being welded in position; the gaps left between each were ½ in. Electrodes of 5/32 in. diameter were used for all three runs, but because of the confined space and awkward working position, and, in addition, to the thickness of the stainless steel, further runs were required to finish off each joint. All welds were overhead vertical up-and-down runs. The outside flange was covered with a 10 gauge stainless steel flange previously drilled, and completely welded in place and then ground smooth.

Section No. 2.—This section comprised the top part of the cast mild steel conical outlet section and was lined with sixteen staves 1 ft. 4 in. long by 3/16 in. thick, dressed to shape with ⅛ in. gaps for welds. All welds applied were vertical up runs, using ⅛ in. diameter electrodes for the first and third runs and 5/32 in. diameter for the second. The length of these staves permitted them to overlap the circumferential mild steel weld joining the cast outlet section to the frustrum by 3 in. The welds of both *Sections 1 and 2* were ground smooth and the whole of the surface well polished to ensure smooth unrestricted flow of pulp at the outlet.

Section No. 3.—This comprised the next highest section of the bottom frustrum and was covered with 54 strips, each 3 ft. long and 3/16 in. thick, and tapering from 4-17/32 in. to 1¾ in. clearance for welds. All welding was vertical down runs using 5/32 in. diameter electrodes for the first run and ⅛ in. diameter for the second and third runs. These strips overlapped the next circumferential mild steel weld by 3 in.

Section No. 4.—This comprised the top dished section of the bottom frustrum and was lined with 87 strips of 12 gauge, each 3 ft. 6½ in. long, tapering from 3-13/16 in. to 3-17/32 in. wide at a distance of 1 ft. 9 in. from the top of the strip, then to 2-23/32 in. at the bottom of the strip. After the tacking process, all welding was vertical down runs using ⅛ in. diameter electrodes for all three runs. The top of these strips finished 1¼ in. below the circumferential mild steel weld which joined the vertical sides to the bottom frustrum.

Section No. 5 (screen plates).—This comprised the cylindrical section of the digester which was 11 ft. 11¾ in. high with the inside circumference varying by up to ¾ in. This area was covered with 33 rows of 12 gauge strip, 4 in. wide, each strip being approximately 4 ft. 3 in. long. Gaps of ⅜ in. were left for welding. The strips were developed at seven to the circumference so that all vertical mild steel welds were covered. This length of strip conformed, at the same time, to the ideal for strip-

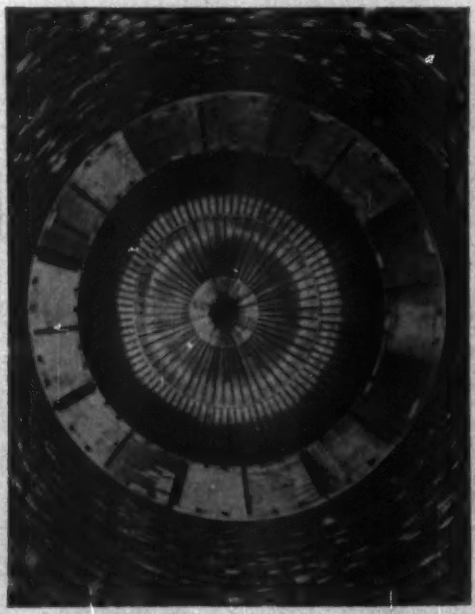

Figure 4—Internal View of Digester (Section 1 to 5).

Figure 5—Internal View of Digester (Sections 3, 4 and 5).

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lining procedure. The horizontal welding of these strips was carried out as follows: The first run using 5/32 in. diameter electrodes was applied along the top of the strip, with the second run using 1/4 in. diameter electrodes along the bottom of the adjacent strip above, and then with the third run in the usual manner, also using 1/4 in. diameter electrodes.

Rows Nos. 1, 2, 5, 7 and 8 of this section were left off until all other sections were completed and until the welding of bosses and brackets in Section 5 for the support of screen plates was finished. Rows Nos. 1, 9 and 25 overlapped the circumferential welds of the mild steel shell by 1/2 in. to 1 in. and finally the top row, No. 33, was finished 2 3/4 in. below the edge of the next mild steel weld. The screen plates consisted of eight top plain plates and eight bottom perforated plates, all out of 3/16 in. "Weldanka" stainless steel, and were supported on a stainless steel frame comprising eight main brackets and eight intermediate brackets, all out of 3 in. by 1/2 in. material. Each of these was fitted in place by two arms welded at right angles to the shell which gave the supporting screen plate bars an incline of 28 deg. 11 min. to the center of the digester. All brackets were then joined together at the apex by welding eight 3 in. by 1 in. stainless supporting bars between each. All bars were tapped to take a total of 248 1/2 in. set screws to hold the screen plates which were held by a further 72 5/8 in. set screws tapped 5/8 in. deep into 2 1/2 in. diameter by 1 1/4 in. long bosses, that in turn were welded in position to the shell. The missing rows of strip were then fitted by trimming to the required shape to correspond with brackets and bosses and the final welding procedure for three runs completed. The screen plates when finally fitted were held by the set screws and tack welded to special backing strips and washers to prevent any risk of their vibrating loose.

The thermometer pocket, test-cock branch opening, pressure gauge branch and liquor outlet were all made up complete and fitted in position with the same welding procedure. All welds surrounding these parts were ground smooth and slightly polished.

Section No. 6.—This comprised the dome section of the top frustrum and was vertically lined with 12 gauge stainless strip, consisting of 82 pieces each 3 ft. 7 1/4 in. long. These were 4 in. wide for a length of 10 in. from the top and then tapering to 3-45/64 in. wide at a distance of 2 ft. 2-3/4 in. from the top of the strip, and again tapering to 3-3/32 in. at the bottom. Welding spaces of 3/8 in. were provided. The bottom of these strips overlapped the mild steel weld by 3 in. The main welding was overhead vertical down runs using 1/4 in. diameter electrodes for all three runs. Some strips were altered to suit the liquor-inlet nozzle; the details of this alteration are given below.

Section No. 7.—This comprised portion of the straight section of the top frustrum and was lined with 68 strips, each 3 ft. 0 1/8 in. long by 12 gauge, tapering from 3-49/64 in. to 1-17/32 in. and with 3/4 in. gaps for welding. Welding was overhead vertical down runs using 1/4 in. diameter electrodes for all three runs. In this section heavy brackets were welded to the shell to support the liquor inlet spray pipe and necessitated the cutting of a few strips to suit.

Section No. 8.—This comprised the relief perforated screen section at the entrance. It was lined with 29 strips, each 12 in. long by 3/16 in. thick, tapering from 3-5/16 in. to 2-7/32 in., and with 3/8 in. spaces for welding. The welding was overhead vertical down using 5/32 in. diameter electrodes for the first run and 1/4 in. diameter for the remaining runs. After the relief pipe had been lined and the outer flanges covered, all welds were ground smooth and after thorough inspection under magnification the flanged conical screen constructed from fine perforated 1/8 in. plate was finally welded in position.

Section No. 9.—This comprised the 2 ft. diameter by 6 in. long heavy cast steel flanged opening at the head of the digester. This was lined with seventeen strips, each 5 1/2 in. long by 4-1/16 in. wide by 3/16 in. thick, and with 3/8 in. spaces for welding. The welding was vertical down using 5/32 in. diameter electrodes for the first run, and 1/4 in. diameter for the remaining runs. The spiggoted flange was covered with 10 gauge stainless steel made in eight segments. The main cover for this opening was covered underneath with 4 in. wide by 12 gauge strip arranged

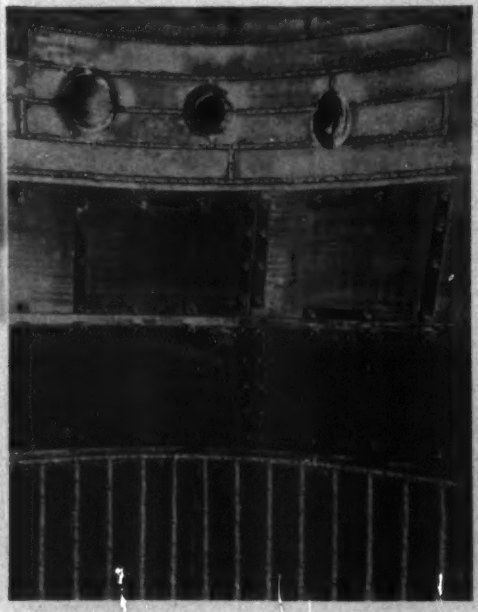

Figure 6—Internal View of Digester—Screen Plates.

Figure 7—Internal View of Digester—Liquor-Inlet Pipe and Spray.

in herringbone pattern. All welds of this section were ground smooth and slightly polished.

Liquor-inlet pipe and spray.—The existing 8 in. cast steel inlet pipe was cut off on the inside of the digester, leaving proud a convenient length suitable for covering on the exposed surfaces with 12 gauge stainless steel strip. A fabricated tube 16¼ in. long with ¼ in. wall was closely fitted inside the cast steel pipe and left protruding on the inside by 3 in., to which was welded a lobster-back bend with ⅝ in. thick recessed flange. This insert tube was welded on the outside to the cast steel and stainless steel covering-flange and on the inside to the exposed edge of the cast-steel-tube wall which was completely covered with weld metal.

The spray pipe and bend which connected to the above, was fabricated from ¼ in. stainless steel plate with ⅝ in. thick flanges and gussets, and this, together with the spray head, sundry bolts and nets, etc., and with all welds ground smooth and polished, presented an interesting all-welded stainless steel component.

Treatment after Welding

All the welds made in the course of lining the digester (except for those in Sections 1 and 2) were left unground, and were chipped, instead, with stainless steel chipping hammers and thoroughly brushed with wire brushes to remove weld slag. The welds in Sections 1 and 2 were, as already stated, completely ground and buffed. Isolated spots on the surfaces of the strips were welded to repair damage caused by accidental arc flashes. Other spots were buffed to remove weld 'sputter.' Each section upon completion was subjected to a minute examination and any suspicious abnormalities were rectified. Then, upon completion, the whole interior was again subjected to a further examination. Finally, the stainless steel lining was washed with a dilute solution of nitric acid to facilitate the formation of an oxide film on the surface of the steel. The discoloration adjacent to the welds was left untouched and eventually disappeared during cooking process.

Illustrations

The photographs reproduced in *Figures 4, 5, 6 and 7* illustrate the appearance of the finishing lining. *Figure 4* is taken from the center of the entrance hole and is directed sideways. It shows a little of *Section 2*, and also *Sections 3, 4, 5* and a part of *Section 6*. The photograph of *Figure 5* is taken from a position directly opposite the screen plates and which it shows as well as portions of *Sections 4 and 5*. The center bar between the plain and perforated screen plates is the nearest point to the camera. The photograph in *Figure 6* is taken from a position at the top of the screen plates and is directed upwards and a little sideways. It shows the liquor-inlet pipe, bend and spray, and also portions of *Sections 5 to 9*. The photograph for *Figure 7* is taken from the level of the brackets to be seen on the wall in *Figure 4*, and shows *Sections 1, 2, 3 and 5*.

Defects and Their Repair

Pressure Test

A pressure test with water and steam was then conducted, during which the pressure in the vessel was raised to 80 lb./sq.in. with a temperature of 160° C. No fault in the lining was revealed by this test.

Working Test Defects

The vessel was returned to service and after being in use for one week was re-examined. The following defects were observed:

(a) Two small pits on the surface of one 3/16 in. strip, *Section 3*, which were caused by accidental flashing of a welding electrode.

(b) An irregular rusty scratch about 4 ft. long due to the scraping of a steel support bracket of the working platform against the lining of *Section 5*.

(c) A slight surface mark about 3 in. long on the end of one 12 gauge strip of *Section 5*, due to accidental flash of welding electrode.

(d) A fine lapping in a 12 gauge strip *(Section 5)* about ¼ in. from the edge and disappearing about 12 in. from one end of strip, due to a rolling fault.

The digester was put back on the production line and operated for a period of six weeks when it was again examined. The following additional defects were then observed:

(e) An indentation or rolling seam on the surface of one 3/16 in. strip, about 6 in. from one end of a strip *(Section 3)*.

(f) A deep welding blow hole which had allowed liquor to penetrate behind a 12 gauge strip, *Section 5*.

(g) A similar deep welding blow hole which had allowed liquor to penetrate behind a second 12 gauge strip, *Section 5*.

Repairs of Defects

The digester was again returned to service for a further nine weeks until the plant was shut down for Christmas 1948, when the defects listed above were repaired in the following ways:

(a) Pits filled in with weld metal, ground smooth and buffed.

(b) Rust had disappeared during cooking. Scratch mark slightly buffed to remove it.

(c) Surface mark removed by slight buffing.

(d), (f) and (g) Strips were cut out and replaced with new strips. Liquor had been lying behind the strips mentioned in (f) and (g), but no active corrosion was observed. Liquor had not penetrated behind the strip in (d) but it was removed to prevent future trouble.

(e) At the indentation the lining was ground through to the mild steel shell leaving a ⅛ in. gap and it was then welded to the shell with the usual three runs. The weld was then ground smooth and buffed.

'Ringing' Test

During this same shut-down period every inch of weld and strip was subjected to a close inspection, as well as to a "ringing" test, in which the lining was tapped in order to disclose the presence of liquor which may have penetrated behind it. By this test another faulty 12 gauge strip ((h) of *Section 5)* was discovered. The ringing note of this strip was the same as that of defective strips (f) and (g). On close inspection a welding pit was found but it was not considered to be deep enough to matter. This strip was then drilled at several points but no liquor was noticed until heat was applied. Due to the expansion of the stainless steel a minute quantity of liquor oozed out through one of the drillings and the strip was removed and replaced. The quantity of liquor behind the strip had discolored only a very small isolated area of the shell.

Faulty strips (f) and (g) were discovered immediately due to the liquor weeping from blow holes and leaving a dark stain. The blow holes recorded against (f), (g) and (h) were all in the first run of weld and adjacent to the edge of the 12 gauge strip, and, also, were in all instances located upon the vertical mild steel welds of the shell.

The digester was again returned to service until the shut-down for Christmas 1949 when it was again closely examined and pronounced to be in excellent condition.

Acknowledgments

It is desired gratefully to acknowledge the advice and assistance of many people associated with the project, and, in particular, the following:

Australian Paper Manufacturers — Members of Corrosion Committee: Professor Hartung, Mr. V. G. Anderson, Mr. P. F. Thompson, Mr. G. S. C. Semmens and the late Mr. I. A. Abraham.

The late Mr. F. E. Schmitt and the staff of the contractors for the work, Messrs. S. Schmitt & Sons.

Research Department and Metallurgists of Australian Paper Manufacturers Ltd.

Brown Bayley's Steel Works Ltd., Sheffield, England, and Mr. S. Hattersley, Victorian Agent of that Company.

The Lincoln Electric Co. (Australia) Pty. Ltd.

United States Steel Corporation.

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Florida's New Process

C. E. Wright

Arrangements have been completed between the Pulp and Paper Laboratory, College of Engineering, University of Florida, and several manufacturers of pulp-making equipment whereby the latter will furnish, without cost, the facilities necessary for the establishment of a pilot plant at the University for the continuous production of chemical fiber from the conifers and the hardwoods, with which the Pulp and Paper Laboratory has been experimenting for some time on a laboratory basis.

This rapid continuous process is to be used for the production of high strength Kraft pulps from southern pine and the manufacture of dissolving pulps from scrub oak and other hardwoods. The pilot plant will be set up in the laboratory building, a short distance from the new College of Engineering Building.

With this pilot plant, it will be possible to produce from three to six tons of pulp every 24 hours, whereas the laboratory output produced up to this time has been measured in pounds. Dr. W. J. Nolan, professor and research engineer, who has pioneered the research work in utilization of scrub oak, and Dr. W. F. Brown, in charge of the laboratory, are confident that the new pilot plant will prove the economic feasibility of the continuous Kraft pulping process. The laboratory work that has already been done has convinced the staff members that the major technical problems have been solved, and they, in turn, have convinced others that the development is worthy of experimentation on a larger scale. A patent on the process has been applied for in the name of Dr. Nolan, and assigned to the Research Corp. of New York, which will make the process available to pulp manufacturers under licensing arrangements.

There has been widespread interest in the process in the pulp-making industry, particularly in the South, where pine and scrub oak abound. It is estimated that in Florida alone there are not less than 5000 square miles of scrub oak forests, while throughout the entire South slightly more than half of the forest lands are hardwoods. The pulping of either pine or scrub oak by the process developed at the Florida laboratory was discussed at length in a paper presented before the Technical Association of the Pulp and Paper Industry in the fall of 1950. This paper was prepared by Dr. Nolan in collaboration with R. L. Harvin, assistant professor of chemical engineering at the University; C. W. Rothrock, Jr., now with the St. Regis Paper Co., and L. M. Reeder, now with the Ethyl Corp., Baton Rouge, La.

Since that time the process has been developed through further experimentation. It is a continuous process adapted to either hard or soft wood and reduces the pulping time to 15 or 20 minutes as against the four hours required for standard procedures. The principal characteristics are maintenance of constant concentration, constant temperatures and rapid reaction rates between chemical and wood during the cook. The process consists of three steps:

1. A very rapid steaming process to soften the lignin of mill-size chips.

2. Mechanical subdivision of the mill-size chips without injuring the fiber length.

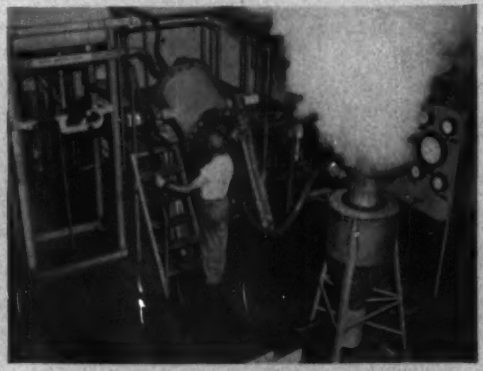
3. These expanded chips then are treated continuously with regular Kraft liquor at elevated temperature for about 15 minutes to produce a high quality chemical pulp.

In the preliminary work, mill-size chips were used, but the screenings were found to be too high to be practical. Dr. Nolan then worked on the assumption that the pulping process is not one of penetration of the chemical into the wood before cooking, but rather a surface reaction in which the

Dr. W. J. Nolan

Dr. W. F. Brown

Air Flotation Table separating Oak bark from wood (bark discharging at extreme right of table).



Experimental Digesters, showing one of the Cooks being blown.

chemical eats its own channels into the chip, exposing the purified cellulose fiber in the outer sections while it is still reacting with the lignin sheath of the cellulose in the inner part of the chip. Further, the experiments were conducted on the assumption that the greater the surface area of the chips exposed, the more rapid the reaction and, consequently, the less degradation of cellulose in the outer part of the chip.

The mechanical treatment of the wood, it was found, expanded the surface area of the chips many times, and this expanded area permitted extremely high reaction rates in pulping. Under these conditions, Dr. Nolan states, highly purified chemical pulps can be obtained in about 15 minutes contact with the cooking liquor (Kraft liquor). By adjustment of the cooking variables such as concentration, temperature and time, high-strength Kraft pulps or dissolving grades from softwoods or hardwoods may be obtained with a saving in time and improvement of quality, Dr. Nolan has found.

Two special precautions have been taken by the Pulp and Paper Laboratory in making pulp by this process. First, a little sodium carbonate is placed in the chip steaming liquor so that it will remain slightly alkaline, preventing acid hydrolysis during the steaming. Second, care has been taken not to destroy any fiber in the mechanical treatment. This was accomplished by the utilization of the grainy structure of the wood so that the chips split along the grain with very little fiber rupture. In appearance the chips resemble short match sticks or toothpicks, which produce pulps of the same strength as regular-size chips.

"By this process," said Dr. Nolan, "we can make Kraft paper with high yields, or, by changing the concentration and temperature, we can produce pulps of 42 to 45 per cent yield from either the pines or the hardwoods with 93-95 per cent alpha cellulose, 3 to 5 per cent pentosan and 1 to 1½ per cent lignin, these figures being based on unbleached pulp. These dissolving pulps have been tested by some of the manufacturers of viscose and acetate rayon and found to be satisfactory for their use. However, further data must be obtained on the pilot plant installation that will soon be in operation."

A preliminary economic survey has shown that a very substantial saving can be made in steam due to the continuous process, possibly as much as 20 per cent, there being no steam loss due to relief of the cook nor is there any steam loss due to heating up the digester for each cook. Since the blow from the cook is continuous, much less heat exchange surface is required for the recovery unit and a more effective recovery of the latent heat from the blow will result. Not only will there be about a 20 per cent saving in steam, but also a saving of 10 to 15 per cent in wood consumption, as the cooking produces a uniformly higher quality pulp with less screenings.

Installation costs for a commercial operation using this process would be about on a par with costs of equipment now being used in pulp making. Initial costs would be somewhat higher than standard carbon steel batch digesters would be of stainless steel, but this would be offset by a saving in replacement, since carbon steel digesters, unless made of plates as thick as 3 in., do not last much more than three years. Installation cost would be about equal to that of stainless clad batch units. No claims are made that any savings in labor costs would result; less labor will be required in continuous pulping but the monetary savings in dollars per ton would be negligible.

One of the problems in connection with the utilization of scrub oak which had to be solved along with the other problems in the working out of this process has been the de-barking of the trees. Following a method originated by Dr. H. N. Calderwood, formerly of the University of Florida Engineering and Industrial Experiment Station, successful results have been attained by the use of an air flotation method. By this method the bark is stripped from the log during chipping, due to the shattering action of chipper knives. Then the separation is completed by gravity on an air flotation table. The bark of about 95 per cent purity is discharged at one end and the de-barked wood from the other end. This chipping can be done in the woods, as the equipment, which is now being used in the Pulp and Paper Laboratory, can be made in portable form so that it can be taken to any point where wood is to be harvested.

As the scrub oak bark contains about 10 per cent vegetable tannin, a by-product industry can be created by a pulp manufacturer using this method. Those who have attempted to harvest bark for tannin extraction by standard bark separation methods have found that they will not work successfully when the sap stops flowing in the trees, by which time the bark has adhered so firmly to the wood that it is virtually impossible to separate it from the wood. Work is continuing at the Pulp and Paper Laboratory on this air flotation method, and recent improvements in the equipment have produced successful results. It is expected that tannin recovery plants will share the cost of the woods operations.

FINANCIAL

H. R. MacMillan Export Co., Ltd., has declared a dividend of 12½ cents on Class A and 12½ cents and extra 30 cents on Class B, all payable September 29 to stockholders of record September 10.

St. Lawrence Corp., Ltd. and its subsidiary companies report unaudited consolidated net profit for the six months ended June 30 amounted to $3,569,685 compared with $3,194,522 for the corresponding period of 1950. On the basis of present capitalization of 1,102,715 common shares outstanding, the six months' net profit would be equal to $3.24 per share compared with $2.90 for the same period of 1950 on the same basis.

Net earnings of Brompton Pulp and Paper Co. for the six months showed an increase of $1,607,692 compared with $915,090 a year ago and those of Lake St. John Power and Paper Co. were higher at $1,287,076 compared with $988,628, while those of St. Lawrence Paper Mills Co. were lower at $1,160,500 compared with $1,803,825 a year ago.

Great Lakes Paper Co., Ltd., reports net profit of $1,818,810 on operating profit of $5,224,924 for the first six months of 1951, compared with net profit for the first six months of 1950 of $1,151,722 on operating profit of $2,902,700.

Provision for income taxes jumped to $2,579,000 from $955,000 in the previous period and there was a sum of $50,000 set aside as provision for contingencies. In the 1950 half-year, there was no contingency provision.

Bathurst Power and Paper Co., Ltd., Bathurst, N. B., reports a net profit of $1,518,313, equal to $2 per Class A share and $2.21 per Class B share, for the six months ended June 30, 1951, compared with net of $1,034,321 or $1.87 per Class A and 87 cents per Class B for the corresponding period of 1950. Class A and B stocks share equally after $2 has been paid on Class A to a maximum of $4 on Class A, after which all payments shall be on Class B only.

FIRST USE OF MAGNETIC AMPLIFIERS ON WINDER DRIVE

The first application of magnetic amplifiers to the control of a large high-speed winder drive is being made by Westinghouse Electric Corp. They will perform control functions formerly obtained by the use of rotating regulators and, in some cases, electronic equipment.

The new winder will handle heavy, 234-in.-wide kraft board at operating speeds up to 5000 fpm at a southeastern paper mill.

Magnetic amplifiers will provide voltage regulation of the system and current-limit control during acceleration and deceleration of the winder, as well as constant-tension regulation of the braking generator with provision for inertia compensation.

The magnetic amplifier is a static device, consisting of electric coils on an iron core, something like a transformer. It has no bearings, commutator, brushes, or electronic tubes, reducing control maintenance to a minimum.

Sulphur, Present and Future

Expansion of sulphur producing facilities of Freeport Sulphur Co., Terrebonne Parish, La., with allowance for a large tax write-off was approved by Defense Production Administration among a number of other projects certified just prior to the current 90-day moratorium, the defense agency has announced. The total applied for was $4,056,600, of which the government certified $3,868,600 and approved 85 percent.

Covered by this Certificate of Necessity is construction of an amphibious mining plant now under way at the Bay Ste. Elaine Dome, La., announced by the Bureau of Mines last Spring as one of the three domes under development which would increase national output by some 530,000 tons. One of the other two, the Starks Dome, La., owned by the Jefferson Lake Sulphur Co., recently went into production. The other, the Spindletop Dome, Texas, Texas Sulphur Co.-owned, is scheduled for early 1952 production. Bay Ste. Elaine should be completed by late 1952.

Freeport's newest project in the Garden Island Bay area, lower Mississippi River delta, recently announced as a find that would yield 500,000 tons yearly, is now in the paper stage. Government assistance will be required to procure materials for construction as well as for tax write-off for the estimated costs of $10 to $15 millions as plans get underway.

Supply Still Short

Though all of these projects aid in relieving the world sulphur shortage, they still fall short of the objective. Two or three more domes of the 500,000 ton size would come nearer the answer, a Dept. of Agriculture expert is reported to have said recently.

Other U. S. Projects

Prospecting for sulphur is proceeding at other domes in the Gulf Coast region and in Mexico which also may lead to the finding of additional commercial brimstone, Langbourne M. Williams, Jr., president of Freeport Sulphur Co. said last week. At least 15 other projects are under way in this country to obtain sulphur from other sources: from pyrites, the metallic sulphides; from sour natural gas and sour petroleum refinery gas, in the form of hydrogen sulphide; as sulphur dioxide from smelter gas; as calcium sulphate from gypsum; and as pyrites and organic compounds from coal, the latter two sources being especially high-cost.

July Production Figures

July production of native sulphur was reported by the Bureau of Mines at 458,025 long tons, compared against 466,063 tons in July of 1950, and with 421,116 in June, 1951. Producer stocks on July 31 were 306,192 long tons less than the 2,975,827 total on the same date last year.

World Efforts to Bolster Supply

A flurry of reports from various observers abroad point to efforts which are being made to bolster the world supply of sulphur.

CANADA—Canada placed sulphur distribution under controls in July which were designed to channel supplies into essential defense and civilian uses. Just prior to this action, it was estimated that conservation measures by sulfuric acid plants of Canadian pulp and paper mills might reduce the rate of sulphur consumption as much as 10 to 15 percent. Canada's pulp and paper industry requirements for 1951 are expected to total 305,000 short tons, slightly under earlier forecasts. Initial deliveries of domestically produced sulphur are not expected before the final quarter of 1952.

Reports on Canadian projects tell of paper industry plans to establish their own supply of sulphur. *Columbia Cellulose* has an agreement with Howe Sound Co., Britiannia Smelting and Refining Co., to process iron pyrites that accumulated at the mine. Columbia will install facilities for the conversion of the pyrites. *Powell River*, in partnership with Shell Oil is proceeding with production of elemental sulphur from Alberta natural gas which is expected to be in production within a year. *Consolidated Paper Co.* has appropriated close to $1 million to build its own plant convert pyrites found in the province of Quebec to sulphur gas; *Donnaconna* also is planning to make its mills self-sufficient. *Anglo-Newfoundland* and *Bowater* are reported to have a joint venture based on Newfoundland pyrites.

Earlier announcements covered plans of the Noranda Mines, Quebec, for producing sulphur and sulphur acid from pyrites to the pulp and paper industry, and acid to the chemical producers.

Construction of a $350,000 sulphur plant is slated to start this month at Turner Valley for Royalite Oil Co. Ltd. The plant which will recover elemental sulphur from natural gas is due to go into operation next April with indicated capacity of 30 tons per day.

MEXICO—Mexican Government plans involve development of several marginal sulphur mines with a possible total output of 1,000 metric tons per month. The Azarco copper smelter at San Luis Potosi is reported to be turning out 40 metric tons of sulphur acid per day and to anticipate raising this to 65 tons. Still another refinery has a daily output of 50 tons. Production at mines at Huascama, San Luis Potosi, is being expanded under a subsidy from the Mexican government, and by late this year should be on a considerably large scale.

BRAZIL is reported to be studying the possibility of producing sulphur domestically using pyrite deposits in the state of Santa Catarina. Brazil has been obtaining brimstone from the United States and cutbacks in its industry requirements are reported to be causing concern, particularly to sugar refineries.

ECUADOR — Contracts have been signed to grant rights for working of the sulphur mines at Tixan to Chemical Plants Corp. which will bring sulphur refining equipment to the site of the mine, also construct a sulphuric acid plant at Riobamba in the Province of Chimborazo. The Tixan mines are at 8,500 feet on a river, and directly on the Quito-Guayaquil Railroad, 100 miles from Ecuador's largest port.

CHILE—Exports of sulphur from Chile again have authorization from the Chilean Government. Suspension was ordered while definite regulations governing exports were underway. First export of 1,200 tons will be followed by further important quantities to European countries, it is reported.

UNITED KINGDOM—An association to be known as the Sulfur Exploration Syndicate has been set up by British manufacturers to make a world-wide search for new sources of sulphur, London reports. Supported by such firms as Imperial Chemical Industries, Monsanto Chemicals, Ltd., and Fisons, Ltd., the syndicate will undertake its first mission in Chile. Surveys also are planned for Central America, Sicily and the Middle East. No plans have been made for the exploitation of any sulphur deposits which may be found by the various missions of the Syndicate which are being undertaken with British Government approval.

A report from the United Kingdom covering only the first quarter of 1951, shows effects of the situation earlier this year in that area, including a sharp drop in production of sulphuric acid from the same quarter of 1950, and a corresponding decline in sulphuric acid consumption. While the major reduction in use was in production of superphosphate, it was reported the paper industry there also was using less.

Independent government reports of somewhat similar tone have been received in recent periods here from Italy, France, India, Eritrea, Turkey, where sulphur was exported for the first time last March, but which exports have since been halted by the government; South Africa, among others.

attention to quality in NIALK* chemicals for pulp and paper manufacture . . . persists even to the selection of containers which will most assuredly safeguard quality in transit.

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Caustic Soda

*Trade-mark

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Liquid Chlorine • Caustic Potash • Carbonate of Potash • Paradichlorobenzene • Caustic Soda • TRICHLORethylene
NIAGATHAL* (Tetrachloro Phthalic Anhydride)

PRICES

The prices below reflect market quotations in New York at the mill level on standard grades. Does not include spot offerings.

PAPER AND BOARD

Standard News, Delivered Ports
Rolls, contract, per ton $114.00/116.00
Sheets ..... 130.00/ —
F.o.b. Mills, C.L. Frt. allowed, dock, N. Y.

Kraft— per cwt., 40# basis wgt.
Standard Wrapping Rolls ..... $7.75/ —
No. 1 Wrapping Rolls 8.25/ 8.50
Standard Bag ..... 7.50/ —

Tissue— per ream 24x36 (480) 10 lbs. 2500 lbs or more
Wh. No. 1 Frd. ..... $2.25 /$2.35
Wh. No. 1 MG ..... 2.25 / 2.40
Wh. No. 1½ ..... 1.95 / 2.05
Wh. No. 2 ..... 1.75 / 1.85
Kraft Anti-Tar 20x30 ..... 2.12 / 2.25
White Anti-Tar 20x30 ..... 2.20 / —

Toilet— per case of 100 rolls—1 M sheets
Unbleached 4½x4½ ..... $8.00/$8.25
Unbleached 4½x5 ..... 6.60/ —
Bleached 4½x4½ 10.00/12.50
Bleached 4½x5 ..... 9.85/ —
Per Case of 50 rolls—2000 sheets
Unbleached 4½x4½ ..... $8.00/$9.75
Bleached 4½x4½ ..... 6.95/ —
Per Case of 100 rolls—1000 sheets
Facial, 4½x5, 2-ply $8.95/10.65

Paper Towels— per case of 3750
Wh. Jr. M'tif'd 9½x9½ $6.40
Br. Sr. M'tif'd 9½x12 ..... 4.10
Br. Jr. M'tif'd 9½x9½ 3.90
Br. Jr. Sgl. fold 9½x10½ 3.95
Bleached 7½x11, 24/25 rolls $7.00/7.55

Manila, per cwt.
No. 1 Jute Tag, 100-lb., sheets*.. $20.35/22.35
Reg. Jute M.F., 40-lb., sheets*... 19.50/21.50
Wrapping Manila 8.75/10.50
Printing Manila 10.50/12.00
* Less usual allowance for rolls.

Gummed Tape—per bdl., 500 bdls. or more
90-lb. 375 ft. GSI ..... $7.20 / —
60-lb. 600 ft. GSI ..... 7.20 / —
35-lb. 800 ft. GSI ..... 8.28 / —
35-lb. 500 ft. GSO ..... 6.21 / —

MARKET WOOD PULP

Third Quarter Contract Prices, Per Short Air-Dry Ton

	Varying freight allowances		On Deck Atlantic Ports		
	*U. S.	Canadian	*Swedish	*Finnish	*Norwegian
Groundwood	$92.50/ —	‡$95.00/100.00			
Sulfate, Bleached	145.00/ —	190.00/200.00	$230.00/ —	$230.00/ —	$230.00/ —
Semi-bleached Sulfate	140.00/ —				
Sulfate, Unbl.	132.50/ —	145.00/175.00	200.00/ —	200.00/ —	
Sulfite, Bichd.	140.00/ —	160.00/175.00	225.00/ —	225.00/ —	225.00/ —
Sulfite, Unbichd.	132.50/ —	150.00/160.00	200.00/ —	200.00/ —	
Sulfite, Unbl'd (Glassine)		164.00/ —			
Soda, Bichd.	140.00/ —	155.00/160.00			
Sulfite Screenings	72.50/ —				
Sulfate Screenings	57.50/ —				
Groundwood Screenings	60.00/ —				
Unbichd Sulfate Siderums	132.50/ —				
Stand. News. Siderums	92.50/ —	106.00 —			

* OPS Ceiling, CPR 49 ‡ F.o.b. Shipping Point.

Boards, per ton—
Filled News ..... $107.50/ —
Plain Chip 105.00/107.50
Bichd. Mlls. L.d. Chip ..... 147.50/ —
White Pat. coated .020 ..... 170.00/ —
Kraft Liners 44 lb. 115.00/117.50
Kraft Corr. .009 ..... 122.50/126.00
Binders Boards 137.50/140.00

The following prices are representative distributors' resale prices:

Rag Content Bonds and Ledgers—
White, 20 lb.

Bonds	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$70.45/$75.90
100% Rag	62.65/ —
75% Rag	48.15/ —
50% Rag	38.90/ —
25% Rag	31.65/ 33.00

Ledgers	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$72.65/$72.80
100% Rag	63.90/ —
75% Rag	49.40/ —
50% Rag	40.20/ —
25% Rag	33.00/ 34.30

Sulphite Bonds and Ledgers
White, 20 lb.

Bonds	4 Ctns.
	per cwt.
Watermarked	$19.00/$20.50
Plain	18.40/ 19.50

Ledgers	4 Ctns.
	per cwt.
Watermarked	$20.30/$21.80
Plain	19.35/ 20.80

White Book

Conversion Coated	Case
	per cwt.
No. 1	$23.90/$24.65
No. 2	22.15/ 23.40
No. 3	21.90/ 22.40

Machine Coated	
No. 1	$18.40/$18.90
No. 2	16.65/ —

Uncoated	
No. 1 Antique (Watermarked)	$19.15/$19.65
Offset	17.40/ 19.90
A Grade E. F.	18.15/ 19.90
A Grade S. C.	18.65/ 19.40
B Grade E. F.	18.40/ —
B Grade S. C.	17.40/ 19.15

‡ Indicates a price change.

WASTE PAPER MARKET

The following quotations were gathered from major dealers in each market. They are an indication of the price range in which volume tonnage was moving on the date specified. Prices to mills, per ton, f.o.b. cars shipping point (includes brokers' fee.)

	New York	Philadelphia	Boston	Chicago
	Sept. 7	Sept. 4	Sept. 7	Sept. 6
No. 1 Mixed Paper	$16.00/ 18.00	$16.00/ 18.00	$17.00/ —	$15.00/ —
Boxboard Cuts	20.00/ 25.00	16.00/ 20.00	23.00/ —	18.00/ —
Mill Wrappers	20.00/ 30.00	20.00/ 22.00	20.00/ —	18.00/ —
No. 1 News	19.00/ 21.00	17.00/ 18.00	— /19.00	18.00/ —
Overissue News	23.00/ 30.00	23.00/ 26.00	22.00/ 24.00	21.00/ —
Corrugated Containers	37.00/ 39.00	34.00/ 35.00	36.50/ 38.00	30.00/ —
New Corrugated Cuts	Nominal	36.00/ 37.00	43.00/ 55.00	35.00/ —
Double Kraft Ld. Corr. Cuts	90.00/ —	90.00/ 95.00	90.00/110.00	90.00/ —
100% Kraft Corr. Cuts	120.00/130.00	110.00/115.00	110.00/130.00	110.00/ —
Used Kraft Bags	85.00/ 90.00	65.00/ 70.00	65.00/ 96.50	35.00/ —
No. 1 Brown Kraft Paper	Nominal	70.00/ 75.00	70.00/ 90.00	35.00/ —
Super Reserted Br. Kraft	Nominal	80.00/ 85.00	80.00/105.00	75.00/ —
New Br. Kraft Env. Cuts	160.00/180.00	135.00/ —	140.00/160.00	120.00/ —
New Br. Kraft Cuts	150.00/175.00	120.00/125.00	130.00/160.00	110.00/ —
No. 1 Gdwd Shvs.	65.00/ 70.00	50.00/ 55.00	65.00/ 75.00	40.00/ —
White Newsblanks	80.00/ 90.00	70.00/ —	70.00/ 80.00	60.00/ —
No. 1 Flyleaf Shvs.	75.00/ 80.00	65.00/ 70.00	85.00/100.00	85.00/ —
No. 1 Soft Wht. Shvs.	180.00/170.00	160.00/165.00	165.00/185.00	150.00/ —
Super Soft Wht. Shvs.	190.00/200.00	170.00/175.00	180.00/200.00	160.00/ —
Hd. Wht. Shvs.	185.00/200.00	180.00/190.00	180.00/205.00	170.00/ —
Hd. Wht. Env. Cuts	200.00/220.00	200.00/215.00	190.00/225.00	180.00/ —
New Manila Env. Cuts	140.00/150.00	140.00/150.00	130.00/155.00	80.00/ —
Col. Tab Cards	110.00/120.00	100.00/ —	85.00/140.00	95.00/ —
Manila Tab Cards	160.00/170.00	160.00/ —	160.00/190.00	165.00/
No. 1 Mixed Ledger	95.00/110.00	80.00/ 85.00	77.00/100.00	95.00/ —
White Ledger	110.00/120.00	105.00/115.00	105.00/120.00	115.00/120.00
No. 1 Book & Mag.†	37.00/ 45.00	30.00/ 40.00	30.00/ 50.00	17.00/ —
No. 1 Rep'd. Hvy. Books‡	43.00/ 50.00	43.00/ 50.00	45.00/ 60.00	40.00/ —

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% groundwood.

RAG MARKET

New Domestic Cotton Cuttings
OPS Ceiling Price, CPR 28
Delivered Mill Basis

Add 7½% Dealer Commission

No. 1 White Shirts	$21.00
No. 1 Unbichd. Muslins	21.00
Bichd. & Unbichd. Underwears	21.00
Bichd. Canton Flannels	21.00
No. 1 Light Silesias	16.00
No. 1 Light Prints	11.50
No. 1 Blue Overalls	14.50
Suntan Khakis	11.50

Add 10% Dealer Commission

Fancy Shirts	$10.00
Indigo Blues	10.00
Mixed Khakis	8.00
Corduroys	8.00
Cottonades	8.00
No. 1 Washables	6.50

Old Domestic Cotton Rags
(Prices to Dealers, f.o.b. Ship. Pt.)

	Per 100 lbs.
Mixed White	$5.00/$5.50
Cotton Pants & Overalls	4.25/ 5.00
Thirds and Blues, Repacked	4.00/ 4.25
No. 1 Roofing Rags	nominal
No. 2 Roofing Rags	nominal
No. 3 & 4 Roofing Rags	nominal

Bagging
(Prices to Dealers, f.o.b. N. Y.)
PRICES NOMINAL

	Per 100 lbs.
Foreign Gunny	$5.00/$5.50
Domestic Gunny, No. 1	5.00/ 5.50
Heavy Wool Tares	5.50/ 6.00
Foreign Manila Rope	8.50/ 8.75
Domestic Manila Rope	9.00/ 9.25
Jute Strings	6.00/ 6.50
No. 1 Sisal Strings	8.00/ 8.25
Paper Mill Tares	4.25/ 4.50
Foreign Scrap Burlap	4.25/ 4.50
Domestic Scrap Burlap	4.75/ 5.50
Wool Pounders	7.50/ 8.50
New Burlap Cuttings	7.00/ 7.50

MATERIALS

Aluminum sulfate:			
comm. bags, wks.	cwt.	1.65	
iron-free c.l.		3.25	
Alcohol, ethyl:			
tax free, dms. c.l.	gal.	1.01	/ 1.05½
dnld. East Miss.			
Alcohol, methyl:			
Synthetic, Zone 1, dms.			
c.l. fr. nld.	gal.	.44	
Casein, acid prec.:			
dom. sh. pt. c.l.	lb.	.38	/ .43
imp. ex. dock	lb.	.30	/ .40
Caustic soda:			
c.l. wks. solid, 76%, cwt.		3.35	
flak. & grd. 100-lb. drums		3.75	
liquid 50% tanks		2.55	
liquid 70% tanks		2.65	
China clay:			
dom. air-float, filler, c.l. wks.	ton	10.00	
water-washed, coarse, filler		11.00	
coating		17.68	/30.90
imported, ex whse.	short ton	13.20	/28.35
Chlorine:			
single-unit tanks, works	cwt.	2.70	
multi-unit	cwt.	3.25	/ 4.40
Formaldehyde:			
USP, lmb. dms, c.l. wks.	lb.	.0625/	.0671
t.c.l., E. wks.		.0675/	.0725
Fuel oil:			
Bunker C, No. 6 Cal. bvy			
tanks, refinery	bbl.	1.95	/ 2.15
light	bbl.	2.00	/ 2.25
Hydrogen peroxide:			
USP, 35% chys. E. of Miss.	lb.	.23½/	.26½
Lime:			
hydrated, bags, wks.	ton	13.50	
Rosin:			
B gum, drms, c.l. Savan.	cwt.	7.00	/ 9.08*
G, H, I, K	cwt.	8.55	/ 9.49*
FF, wood, dc.	cwt.	6.80	/ 7.30
* OPS Ceiling, CPR 52.			
Rosin size:			
70%, gum & pale grds. tank			
cars, south, sh. pt.	cwt.	7.00	/ 7.10
Salt cake:			
dom. bulk, c.l. wks.	ton	17.00	
wks. frt. all.	ton	20.00	/22.00
Soda ash:			
light, 58%, bags, wks.		1.50	
bulk	cwt.	1.31	
Sodium silicate 40°:			
turbid. c.l. wks.	cwt.	1.30	/
t.c.l. wks.		1.60	/ 1.85
Sodium peroxide:			
dms. c.l. E. of Miss.	lb.	.21	
t.c.l. dc.	lb.	.21½/	.22
Soybean, protein:			
chem. isol, wks. c.l.	lb.	.24	/ .28
Cinn. and Chic.			
Sulfuric acid:			
60° Be. chys. cl. wks.	cwt.	1.75	/ —
t.c.l. wks.	cwt.	2.03	/ 2.85
Sulfur:			
crude, c.l. mines, contract.	long ton	21.00	/22.00
f.o.b vessels Gulf		22.50	/23.50
Sulfur dioxide:			
liquid, comm. cyl. wks.	lb.	.09	
multi-unit cars	lb.	.0531	
Starches:			
pearl corn, bags, c.l. wks.	cwt.	6.09	/ —
white dextrines, c.l. wks.	cwt.	7.48	/ —
potato, Idaho, c.l. wks.	cwt.	5.75	/ —
potato, Maine, c.l. wks.	cwt.	6.00	/ —
tapioca, conv. dextrines	cwt.	8.00	/ 8.75
low, Siam, on dock N.Y.		5.50	/ 5.75 nominal
Talc:			
domestic, 50-lb. sacks, c.l. wks.	ton	25.00	/30.00
Titanium dioxide:			
anatase, c.l. dcld., bags	lb.	.21	/ .21½
t.c.l. dcld.	lb.	.22	/ .22½
rutile, c.l. dcld.	lb.	.23	/ .23½
t.c.l. dcld.	lb.	.24	/ .24½

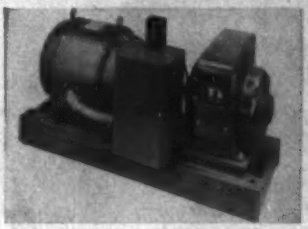
K
ONLY NASH VACUUM PUMPS HAVE ALL THESE FEATURES
One Moving Element. Non-pulsating Vacuum.
No Internal Parts In Wearing Contact. No Internal Lubrication. Handles Liquid With Air.
No Expert Attendance. Constant Efficiency.
Low Maintenance Cost.
Plus—
K

NASH ENGINEERING COMPANY
409 WILSON AVE., SO. NORWALK, CONN

New Equipment

360-Cycle MG Set

Used to convert 60 cycle current to 180 cycle and 360 cycle frequencies, is a new mono-coil medium frequency motor generator set which will find its greatest use in plants using medium-cycle automatic electric hand tools, such as grinders and buffers. Described

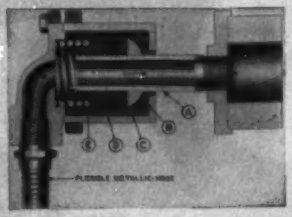


as self exciting, the sets have built-in voltage regulation which automatically compensates for fluctuations in voltage to the load. Unit shown is 6 kw, 360 cys, 3600 r.p.m. Other ratings and speeds are available. Built by Electric Machinery Mfg. Co., Minneapolis, Minn.

Heavy Duty Rotary Joints

Self-supporting Type S Rotary Pressure Joints are now available in heavy duty construction suitable for operating pressures up to 250 lbs. The Type S, a specialized variation of the regular Rotary Pressure Joints, is used widely in paper making. It was developed specifically to combat the threat of misalignment—for service on machines such as calenders where considerable lateral movement of rolls is encountered. Its application has been limited to a ceiling of 150 lbs. maximum operating pressure. This new higher pressure design will make the self-supporting Type S available for much wider use.

Illustration shows sectional view. Nipple (A) is connected to roll. Carbon graphic seal ring (B) rotates



against convex surface of nipple collar (C). Guide (D) supports the joint, is also of long-lived carbon-graphite. Spring (E) is for initial seating only. Joint shown is for through-flow service; it is also available for syphon pipe service.

Write to Johnson Corp., Three Rivers, Mich., for Bulletin JS-3.

Tote Bin Jackstacker

This new Jackstacker was especially made for handling "Tote" Bins, a tightly sealed container for handling, shipping and storing bulk materials. It is made in telescopic and non-telescopic models having a capacity for 4000 pounds load up to 48" long. The non-telescopic unit has a fork elevation of 53", and the telescopic model has a fork elevation of 77", so that the Tote Bins can be easily double-decked in storage areas.

Lifting forks are constructed with an 11" opening to provide ample clearance on each side of Tote Bin tilt racks. A special lifting arrangement permits the bins to be tilted on the tilt rack by the Master Jackstacker in addition to the usual functions associated with this type equipment.

Manufactured by Lewis-Shepard Products, Inc., 194 Walnut St., Watertown 72, Mass.

Tape Printer and Dispenser

Named Ad-o-Matic No. 1, the new gummed-tape dispenser includes a rotary printing head to mark with ink

in any one of six specified waterproof colors. Printed impression is made as the tape is moved out of the dispenser for application. Ink will remain alive on its roller for periods to 30 days, it is claimed. The rubber mat can be changed quickly.

Feed length is maximum at 7". The housing takes rolls of outside-gummed tape (G.S.O.) to 500' in length, and from ¾" to 1½" in width. Printed surface is maximum at 4" in length. The ink is quick-drying and waterproof.

Write to Travers & Co., Inc., 665 Atlantic Ave., Boston, Mass.

Gas Heated Mixer

A gas-fired mixer for processing under controlled heating conditions is in production. The inner mixing tank, 36" diameter by 36" high with a dished bottom, is made of 14 gauge stainless steel for atmospheric working pressure. A full jacket, for 5 p.s.i. gauge working pressure, surrounds the inner tank. Outer jacket wall extends down and is flanged to form a stable base. Four ring-type gas burners are rated at 300 c.f.m. and burn manufactured gas. Agitator mechanism consists of

ENGLISH ECCO CLAYS CLAYS

TRADE MARK

UNIFORM SUPERIOR DEPENDABLE

English China Clays Sales Corporation
551 Fifth Avenue, New York City

six 1½" wide, stainless steel, vertical blades equally spaced on a horizontal stainless steel tee bar driven by a 2 hp. gear motor through a speed reducer at 47 r.p.m. Discharge is made through the bottom of the tank and is controlled by means of a horizontal long-stem valve handle of which extends beyond the outer shell.

Built by L. O. Koven & Brother, Inc., Jersey City, N. J.

NEW SUPPLIES

Expanding Steel Strap

Known as Expand-R-Strap, the product is a corrugated tempered stainless steel strap designed to hold insulation snugly around tanks, drums, pipe and other equipment which expands and contracts in circumference, such as digesters. Corrosion-resistant to most chemical fumes and mild acids, its corrugation designed to maintain a constant pressure through all temperature variances, the strapping is regularly furnished in 320' coils, five feet corrugated and five feet plain strap alternating the entire length. Each corrugated section has a ¼" amplitude. Corrugated sections can be varied to meet special conditions.

Made by A. J. Gerrard & Co., 1950 North Hawthorne Ave., Melrose Park, Ill.

Copper Coated Wires

The new electroplated steel wires with heavy copper coating are said to be lighter and stronger than solid copper wires. The heavy electroplated copper coating is perfectly and permanently bonded to a low, medium or high carbon steel core wire for many applications.

It is stated that the new "Copperon" wires provide electrical conductivity at high frequencies which is comparable to that of solid copper wire, but they provide the advantage of increased dimensional stability, mechanical strength and light weight which are important in conditions of vibration encountered in mobile, aircraft, industrial and military electronic uses.

The coating on Copperon wires cannot be destroyed by changes in temperature, by pounding, by hot-rolling or cold drawing, the producer claims. Relatively heavy cross-sections of the initial product are cold drawn to required diameters without change in the ratio of copper to steel or impairment of the bond between the two metals. Since the steel core is lighter than copper "Copperon" wires provide about 10 percent more footage per pound than solid copper wires of the same outside diameter. They are available in practically any length and in diameters ranging from ¼" diameter to the finest wire gauge sizes.

Kenmore Metals Corp., 380 Ninth St., Jersey City 2, N. J.

Reversible Plastic Gloves

Announced is a reversible plastic-coated glove so constructed that it can be worn on either hand. Due to the unique construction (free-swing thumb) the gloves are interchangeable. Made of impregnating plastics which are held to be the strongest and most pliable, developed by science, that can be used for this purpose, fully Jumbo cut to exacting specifications, the gloves

Three direct-connected Vacuum Pumps operating in West Virginia paper mill since 1932.

YOU NEED ALL 5 FOR BEST PERFORMANCE

You'll obtain all 5 of these basic needs when you select R-C Cycloidal Vacuum Pumps, built especially for paper mills:

1. **LOW POWER CONSUMPTION**—because units are recommended, either single or compound, to operate at the most efficient point.
2. **NEGLIGIBLE FRICTION LOSSES**—no contact between impellers or impellers and casings.
3. **HIGHER SPEEDS**—permitting direct connection to standard motors, saving first cost, space and weight.
4. **FLEXIBILITY**—to meet varying demands; suction automatically overcomes resistance in system.
5. **DEPENDABILITY**—long-time, attention-free operation, due to simplified design and construction.

For many years, R-C Vacuum Pumps and related equipment have proved profitable investments for paper mills of any size. Bulletin 50-B-13 sent on request.

Roots-Connersville Blower Corporation
510 River Avenue, Connersville, Indiana

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BLOWER BUILDERS SINCE 1854
ONE OF THE DRESSER INDUSTRIES

ALWAYS SPECIFY
Stroh
WEAR-RESISTANT
Replacement Parts
for
Kilns Rod Mills Compeb Mills
Coolers Tube Mills Crushers
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other similar equipment

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GIRTH GEARS

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PINION GEARS

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GEARS • PINIONS • METAL TIRES • TRUNNIONS • SHEAVES • SPROCKETS • CRUSHER PARTS • RACKS AND PINIONS

Specialists since 1916 in the fabrication of gears, tires, trunnions, sprockets and allied parts for processing equipment . . . Stroh engineers have perfected a method of applying a high grade, wear-resistant alloy steel to the wearing surfaces only of plain carbon steel. Let us show you case studies of long service life, economy and smooth operation of equipment.

Write today!

Stroh PROCESS STEEL CO.
Established 1916
PITTSBURGH 12 PENNA., U.S.A.

have a soft, fleecy lining for hand comfort. Available in Knit Wrist, Short Gauntlet and Full Gauntlet models in 5 colors.

Washington Glove Corp., 106 N. Water St., Milwaukee, Wis.

NEW LITERATURE

Allis-Chalmers Mfg. Co., 994 S. 70th St., Milwaukee, Wis. Bulletin 52B-7638, "Oil Lubricated Pedestal Mounted Pump." Gives construction features and sealing arrangements. Technical plus sales copy.

Detroit Stoker Co., Monroe, Mich. Booklet, "Burn Refuse or Coal Separately or in Combination with Detroit Stokers." Technical plus sales copy. Illustrated.

Improved Paper Machinery Corp., Nashua, N. H. Bulletin J-100. Features cut-away drawing of an ideal pulp mill building with pulp-washing high-density storage, screening and deckering operations, together with a four-stage bleach plant all contained in one building. Flow sheet also.

The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y., Technical Bulletin T-17, "Fabrication and Design of Nickel and High-Nickel Alloy Pipe and Tubing." Presents tables on mechanical and physical properties, A.S.M.E. code requirements, recommended welding procedures and other information. Illustrated. Available gratis.

Lukens Steel Co., Coatesville, Penna. "Benefits of Clad Design in Pulp & Paper Equipment." Low Maintenance: Control of Sliming; Engineering Advantages, etc.

National Aluminate Corp., 6221 West 66th Place, Chicago 38, Ill. Bulletin 57, (Nalcite SAR), "Nalco Ion Exchange Materials." Bulletin 58, (Nalcite HCR), "Nalco Ion Exchange Materials." Bulletin 59, (Super Nalcolite), "Nalco Ion Exchange Materials." Complete discussions supplemented with tables and graphs explaining performance of these water treating resins under various operating conditions. Explains physical characteristics, exchange capacities, and regeneration techniques. Complete enough for planning and designing ion exchange type water treating installations.

Poirier Control Co., Waterville, Maine. Bulletin, "Poirier Syphon System for Economy." Sales copy.

EUROPEAN SPOTLIGHT

PRICES CRAMP PAPER USE

Generally speaking, the month of August did not bring great differences in European paper markets. On the whole, there were no new price increases to mention, and the feeling that prices may have reached their tops, is rapidly spreading. In most countries merchants have some difficulties selling at the high prices quoted, consumers being inclined to await future developments. There can be no doubt that high prices have diminished work in graphic and paper converting industries; from nearly all European countries come reports mentioning the death of magazines and newspapers.

In the field of packaging, even in the field of food-packaging, it is to be feared that high prices of paper give rise to a tendency of returning to the old days of unpackaged food. Some years ago, most European countries tried hard to come to American standards of food packaging; it will be very hard to continue to buy the necessary paper at the high prices prevailing these days. Though some countries, among them Switzerland, still show in their shops a display of well-packaged goods, however, in other countries the shops show clearly the effects of paper scarcity. In Holland, semi-official committees on economizing paper have recommended the dropping of any luxury packaging.

Belgium paper production was at its highest in 1950 with 301,000 tons, and this year a new record is hoped for, presumably 50,000 tons higher. Newsprint production was 61,651 tons (in 1949, 49,800). Imports of newsprint amounted to 21,000 tons, of which 11,219 tons were imported from the Netherlands. Prices of newsprint increased considerably during the last years, not only in Belgium but also in other European countries, as may be seen from the following table:

	2nd quarter 1950	2nd quarter 1951
Belgium	114.00	212.40
Netherlands	111.75	199.00
Norway	121.05	275.50
Finland	120.80	280.20

(All prices are in U. S. Dollars per short ton.) Trade-index for paper prices in Belgium (1936-1938 = 100) reached 743, whereas in 1950 the index was generally about 424.

France has met considerable trouble in getting the pulpwood it needs. Cutting rights in the French zone of Germany ended in 1949, and a considerable part of its own forests were devastated by forest fires in 1949. Finland, formerly an important supplier to France, is not able to fill the gap, and supplies from Canada are not coming in as smoothly as is required. It is hoped here that prices will be a little more stable now, but it must be said that in France paper prices are not only influenced by the pulp market, but also by the rather unstable wage level in France.

Many projects concerning production of raw materials from home-grown woods and grasses, and from tropical woods, are circulating in the trade press. One of the latest projects, we heard about, incorporated the utilization of hemp waste by a process, found in Italy, but up till now not yet applied industrially. A new paper mill is projected in Alizay Eure). This mill is to utilize inferior wood, found abundantly in the forests of Normandy.

Spain. Rumors are circulating about projects to utilize home-produced raw materials for the paper industry, supplies from Scandinavia being scarce and costly. Among home-grown raw materials, esparto is rather important and in 1950 nearly 24,000 tons of esparto pulp were produced. Albardine, an esparto-variety, is used for making unbleached sulphite pulp, production is stated to be about 8,000 tons, annually.

Straw-pulp production, much hampered by low straw production of the Spanish farms, is said to amount to 11,500 tons yearly. Wood pulp was produced in a quantity of 26,000 tons in 1950, but it is stated that in the North of Spain great projects are being carried out and that after some years Spain may be able to produce all raw materials it needs. Imports of all kinds of pulp are now about 35,000 tons annually, as against 130,000 tons (!) before the civil war. Consumption, being 150,000 tons, has not risen during the last 15 years.

Italy. At Florence, a new mill was established under the name of Soc. per Az Stabilimento Industriale Lavorazione Carta. Particulars are not yet known.

An authorization was received for the delivery of $4,000,000 worth of pulp, paper and paper products (except pulpwood or newsprint) from the ECA.

Greece also received such an authorization from the ECA, amounting to $250,000, for delivery before June 30, 1952.

Iceland received such an ECA authorization to the value of $260,000, for terminal delivery April 30, 1952.

Germany. Sulphate pulp is a raw material which is extremely scarce all over Europe. For the year 1951 it is estimated that all ERP countries together lacked about 200,000 tons. All German mills producing sulphate pulp are situated in the Eastern zone, and Western Germany cannot afford to procure the quantities needed by import.

With OEEC-help, a new sulphate pulp mill will be built in Western Germany by Zellstoffabrik Waldhof. Production is planned to be 24,000 short tons of bag paper and 24,000 short tons of kraft board. Calculated at the prices of these days, Germany might save in this way the 16–18 million scarce dollars. The capital needed amounts to 100 million DM, one quarter of which is furnished by Waldhof itself. The site of this planned mill is not yet known; among others, Mannheim is mentioned. Construction will take 2–3 years; machinery will be furnished by German constructors, except some special equipment which has to be bought in the U. S.

Sweden's production of sulphite pulp is endangered by restrictions on the import of sulphur. The director of the Swedish Chemical Industries Bureau stated that scarcity of sulphur will cut production of sulphite pulp by at least 150,000 tons a year.

Swedish exports of paper, among which is newsprint, declined a little during the first half of 1951. Value of tonnage in kronor rises, however, steadily, especially cellulose prices. Compared with price level of 1939, they show an astonishing peak:

	1939 kronor	May 1951 kronor
Bleached sulphite	220	1480
Unbleached sulphite	150	1410
Bleached sulphate	190	1470
Unbleached sulphate	120	1270

(prices for short tons)

Sweden plans to increase its output of paper from 1.2 million in 1950 to 1.5 million tons in 1955. The quantity, available for export, will increase, it is estimated, from 740,000 to about 900,000 tons.

England. The latest price increases are generally thought to be the last. Price limits for Swedish pulp in the U. S., together with a more stable price level for pulp, are strong arguments for those tradesmen predicting no further price increases.

A. P. W. INCREASES FORCE

APW Products Co., Albany N.Y., has added 150 more workers in recent months due to improved business.

Lindsay

Fourdrinier Wire Cloth
is BABIED Throughout Its Manufacture

Packing — an odd-and-end, unimportant, necessary evil? NOT AT LINDSAY. Every precaution is used to keep all injurious matter out of the box and to avoid other threats which the layman would never even suspect existed. One of a long series of operations in which every Lindsay wire is really "babied".

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ASSOCIATIONS

Alkaline Pulping Conference

The TAPPI Alkaline Pulping Conference will be held at the John Marshall Hotel, Richmond, Va., on September 26-28, 1951. Henry Vranian of The Chesapeake Corp. of Va., West Point, Va., is general chairman and R. R. Fuller of the Gulf States Paper Co., Tuscaloosa, Ala., is program chairman. Following is the final program:

September 26

9:30 a.m. Wood Room Operation Session (Virginia Room), Henry Vranian, Chairman.

1. "The Cellulosic Raw Materials Situation," by James W. Cruickshank, U.S. Forest Service, Asheville, N.C.
2. "Checking Wood Quality," by M. Klein and J. M. Ralson, Union Bag & Paper Corp., Savannah, Ga.
3. "Chipping Operations," by Vance P. Edwardes, Consultant, Corinth, N.Y.
4. "Effect of Chipping Knife on Wood Conservation," by Harold F. Wood, Jr., Heppenstall Co., Pittsburgh, Pa.
5. "Usable Wastes in the Woods," by J. J. Armstrong, Union Bag & Paper Corp., Savannah, Ga.
6. "Wood Losses in Chipper Operation," by N. P. Wardwell, Carthage Machine Co., Carthage, N.Y.

12:30 p.m. Luncheon (Roof Garden).

2:00 p.m. Wood Room Operation Session Continued (Virginia Room), Henry Vranian, Chairman.

7. "Suspension Burning of Bark Refuse," by Robert E. Elwanger, Chesapeake Corp. of Va., West Point, Va.
8. Color film: "Bark Furnace in Operation," by Otto de Lorenzi, Combustion Engineering - Superheater, Inc., New York, N.Y.
9. "Survey of Chipping Operations," by R. H. Stevens, National Container Corp., Jacksonville, Fla.
10. Discussion of papers on Wood Room Operation.
11. "Coating Ingredients from Tall Oil," by C. R. Outterson, M. G. Selden, Albemarle Paper Mfg Co., Richmond, Va., and J. W. Eldridge, Asst. Prof. Chemical Engineering, University of Virginia, Charlottes, Va.
12. "Flash Drying of Lime Kiln Mud," by Henry Vranian, Chesapeake Corp. of Va., and Robert D. Nickerson, Combustion Engineering-Superheater, Inc.

September 27

9:30 a.m. Cooking Symposium (Virginia Room), R. R. Fuller, Chairman.

1. "Cooking Knots and Rejects," by K. G. Chesley, Crossett Lumber Co., Crossett, Ark.
2. "Discussion of Controls, Circulation and Indirect Heaters," by Robert Bower, North Carolina Pulp Co., Plymouth, N.C.
3. "Effect of Bark in Sulphate Pulping of Slash Pine," by J. S. Martin and K. J. Brown, Forest Products Laboratory, Madison, Wis.
4. "Continuous Manufacture of Semichemical Pulp for Corrugating Board," by J. McK. Limerick, Bathurst Power & Paper Co., Bathurst, N.B.
5. "Quality of Paper from the Sutherland High Yield Sulphate System," by Douglas G. Sutherland, Sutherland Refiner Corp., Trenton, N.J.
6. "Chemical Reaction Equilibria in the Combustion of Sodium-Base Pulping Liquors," by Malcolm N. May, Institute of Paper Chemistry, Appleton, Wis.
7. "Cooking Southern Wood for High Brightness Bleached Sulphate Pulp," by Malcolm B. Pineo, Brunswick Pulp & Paper Co., Brunswick, Ga.

12:30 p.m. Luncheon (Roof Garden).

2:00 p.m. Cooking Symposium Continued (Virginia Room).

8. "Neutral Sulphite Semichemical Pulp," by Richard G. Coker, Sonoco Products Co., Hartsville, S.C.
9. "Semichemical Pulping and Wood Species," by J. N. McGovern and E. L. Keller, Forest Products Laboratory, Madison, Wis.
10. "Scandinavian Pulping Practices" (speaker to be announced).
11. "Review of Methods of Determining Degree of Pulping."
12. "The Kamyr Continuous Digester," by Johan Richter, Karlstadt Machine Works, Karlstadt, Sweden.
13. "Distribution of Cellulose and Hemicellulose in the Cell Wall of Sulphate Pulp in Comparison with Other Pulps," by Paul Lange, Swedish Forest Products Research Institute, Stockholm, Sweden.
14. Panel Discussion of Cooking, R. R. Fuller, Moderator.
"Hard Cooking of Northern Woods," by John P. Lunderville, Brompton Pulp & Paper Co., Red Rock, Ont.
"Equipment": A. C. Clarke, Emerson Mfg. Co., Lawrence, Mass.; T. W. Small, Sprout, Waldron & Co., Muncy, Pa.; L. D. Smiley, Gruendler Crusher & Pulverizer Co., St. Louis, Mo.; and L. S. Durant, Paper & Industrial Appliances, Inc., New York, N.Y.
"Cooking for Bleached Pulp": W. A. Stone, Mathieson Chemical Corp., Baltimore, Md.
"Corrosion": (panel member to be announced).
"Instrumentation": J. M. McAlear, Mason-Neilan Regulator Co., Boston, Mass.
"Operation": Franklin L. Jones, St. Joe Paper Co., Port St. Joe, Fla.; W. F. Gillespie, Gaylord Container Co., Bogalusa, La.; others to be announced.

September 28

1. Visit to the mill of the Chesapeake Corp. of Va., at West Point, Va.
2. Luncheon and visit to the Colonial Village, Williamsburg, Va.
3. Return to Richmond, Va.

RESIDUES COMMITTEE MEETING

There will be no Fall meeting of the Fibrous Agricultural Residues Committee of TAPPI in 1951. This was decided by a majority vote of the committee membership. The round table discussion on strawboard-mill problems scheduled for this meeting will be held during the annual TAPPI meeting in New York in February 1952.

NAWMD FALL MEETING

The general waste paper outlook will be discussed at the Waste Paper Institute gathering to be held at the National Assn. of Waste Material Dealers, Inc., Fall meeting to be held Friday, Sept. 21 at the Saranac Inn, Upper Saranac Lake, N. Y.

Although the fluidity of the situation may result in program changes and additions, Mr. Stovroff stated that at the present time the agenda is expected to include the following:

Washington meetings—Jean B. Cha-

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AMERICAN PAPER AND PULP ASSOCIATION'S PAPER PRODUCTION RATIO REPORT

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

	Aug. 4	Aug. 11	Aug. 18	Aug. 25	Sept. 1
1951	100.3	99.9	98.2	100.8r	96.8*
	Aug. 5	Aug. 12	Aug. 19	Aug. 26	Sept. 2
1950	99.4	98.5	100.0	100.6	99.2

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1950	92.6	93.6	96.7	95.4	96.4	97.7	85.3	99.8	96.1	101.0	99.6	91.2	95.8
1951	99.3	101.3	101.9	102.8	102.5‡	100.2‡	89.4‡	99.3‡					

‡ Preliminary.
r Revised.
* Weekly capacity base increased 3,749 tons.

COMPARATIVE YEARLY SUMMARIES

	1944	1945	1946	1947	1948	1949	1950	1951
Year to Date	87.5	87.7	99.8	101.3	97.4	85.8	95.1	99.8
Year Average	88.1	89.4	101.1	104.3	96.2	88.6	95.8	

PAPERBOARD OPERATING RATIOS†

	Aug. 4	Aug. 11	Aug. 18	Aug. 25	Sept. 1
1951	94	94	93	94	93
	Aug. 5	Aug. 12	Aug. 19	Aug. 26	Sept. 2
1950	98	99	101	100	100

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1950	88	92	91	92	91	94	82	100	96	102	101	95	94
1951	102	105	104	103	104	103	84	93					

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "inch-hours" reported to the National Paperboard Association.

rak, Federal Paper Stock Co., St. Louis, Mo.

Group Insurance—John Rogers, New York City.

General outlook—James T. Flannery, James T. Flannery Co., Jersey City, N. J.

Self-Administered Truts—Victor J. Wolder, New York City.

In addition, special reports will be given by Haskell Stovroff, president, and Clinton M. White, NAWMD executive vice-president who is secretary of this component group.

F. C. BOYCE STUDENT AWARD

The American Pulp and Paper Mill Superintendents Assn., 111 W. Washington street, Chicago, Ill., in its desire to honor and perpetuate the name of Fred C. Boyce, so long and favorably known to the association as "Daddy," is establishing a Student Award in his name. This award, to be known as the Fred C. Boyce Student Award, is being instituted at the University of Maine, Orono, Maine; State University of New York, College of Forestry, Syracuse, N. Y.; and Western Michigan College, Kalamazoo, Mich.

The purpose of the award is to spur undergraduate pulp and paper students in each of the three-named institutions to highest possible attainment in their work course, and to fix their desire to enter the pulp and paper industry upon leaving school.

The selection of the award winners, one from each college annually is to be made from the pulp and paper junior student body. The method of determining the award, for the time being, is to remain unannounced. The amount of each award is to be $200.

OBITUARIES

William H. Hampton, 47, assistant treasurer of the Abitibi Power and Paper Co., Ltd., died in Toronto General Hospital in Toronto, Ont. He joined the company in Montreal, Que., nearly 30 years ago and came to the Toronto office in 1930. He is survived by his widow and three daughters.

A. Cooper MacFarlane, vice-president of the Carter Paper Co., died September 4 following a short illness. During his 50 years of service with the firm he held a succession of increasingly important positions, becoming a member of the board of directors some years ago, and vice-president on January 29, 1944. He became affiliated with the Carter company in 1899.

R. T. Petrie, western sales manager, Black-Clawson Portland office, was killed in an airplane crash at Oakland, Calif., August 24.

Norman W. Sultzer, eastern sales manager of the Research Corp, New York, N. Y., died on August 11.

John D. Watson, 71, vice-president and general manager of the Wisconsin Wire Works, died August 23, after a long illness.

In addition to many Appleton civic duties, he served as a director of the Pacific Coast Paper Mills, at Bellingham, Wash.

Bowater Plans U. S. Newsprint Mill

Sir Eric Bowater, chairman of the Bowater Newfoundland Pulp and Paper Mills, disclosed on September 9 at Corner Brook, Nfld., plans for a large newsprint mill near Chelton, Tenn.

A reply is being awaited from the U. S. Government to a request for a certificate of necessity, which is required before a start can be made on the project.

The development would have an annual capacity of 1,300,000 tons of newsprint and 50,000 tons of kraft. No estimate of the cost of the project was given.

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Modern Processing Methods
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STAINLESS STEEL CASTINGS
FOR ALL EQUIPMENT EXPOSED TO CORROSION BY SULPHITE ACIDS OR OTHER CORROSIVE AGENTS
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HELP WANTED

MEN WANTED—POSITIONS OPEN

We can place manager large pulp and paper mill, excellent salary and bonus; night superintendent Fourdrinier machine paper mill; managers and superintendents for board mills.

Machine foremen (several); assistant controller; merchandising manager; salesman for lithographed, packaging and advertising materials; chemists, chemical engineers and laboratory men, salary range $3600-$8000; master mechanics and plant engineers salary range $6000-$8000; back tenders, machine tenders, third hands and fourth hands, beater engineers.

LIST YOUR CONFIDENTIAL APPLICATION WITH US to keep informed of attractive positions open in the pulp and paper mills.

CHARLES P. RAYMOND SERVICE, INC.
294 Washington St. Boston 8, Mass.
SPECIALISTS IN PLACING PULP AND PAPER MILL EXECUTIVES S-14

WASTE PAPER BUYER

National organization needs experienced waste paper buyer for Mid-West paperboard plant. Excellent opportunity for advancement with growing company.

Send complete details of experience and personal history.

Address Box 51-448 care Paper Trade Journal. S-14

CHIEF DRAFTSMAN

Old established paper machinery manufacturer located in the middle west desires a chief draftsman. Man with engineering degree preferred but not necessary. Experience essential and must be experienced with paper mill machinery. Must be able to lead men and obtain good production at a reasonable cost. Permanent. Give complete information in your letter. Write Box 51-441 care Paper Trade Journal. S-14

ASSISTANT
TO MILL AND CONVERTOR AGENT

One man business with excellent supplier connections, at present nothing in East and export markets, ready to expand.

Need experienced, ambitious man under 35 with sales and promotional ability to handle correspondence, office detail, and contact on existing business and help develop new accounts.

State personal history, experience, salary. Box 51-450 Paper Trade Journal.

TOUR BOSS WANTED

For progressive two machine board mill in Eastern Pennsylvania. Manufacturing set-up and folding boxboards and specialties. Steady employment. If you are available, write Box 51-453, Paper Trade Journal, giving experience and age. S-14

LAKE STATES Specialty Kraft Mill has need of Machine Tenders and Back Tenders. Best of working conditions. Pleasant progressive community. Splendid opportunity for qualified men. Write Box 51-458 care Paper Trade Journal giving detailed experience and background. S-21

HELP WANTED

PERSONNEL SERVICE ASSOCIATES,
118 State Street, Springfield 3, Mass.
Confidential Placements—Personnel Consultants

Position open for

Cost Accountant; Chemists, exper. paper, pulp and plastic coating, respectively; Personnel Manager; Salesmen for Stationery; Superintendents; Supervisor Fin. Room; Tour Bosses (1) Pulp; (1) Paper; (1) Paper Board; Sales Engineers, Beater Engineers, Color Man; Machine Tenders and Back Tenders. S-14

SALARIED POSITIONS $3,500 to $35,000. We offer the original personal employment service (established 41 years). Procedure of highest ethical standards in individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC. —117 Dun Bldg., Buffalo, 2, N. Y. TF

WANTED—Master Mechanic or Assistant for modern 3-Machine Tissue Mill. Progressive management; expansion program now under way. Fine opportunity for young/middle aged man to advance. Substantial paper mill mechanical experience with electrical background desirable. Give complete resume of experience in letter to Box 51-442 care Paper Trade Journal. Replies held strictly confidential. TF

WORKING SUPERINTENDENT for small fast growing Eastern mill making lightweight specialties. Cylinder machine experience essential. State qualifications and salary expected. Address Box 51-87 care Paper Trade Journal. TF

MACHINE TENDER WANTED—for Fourdrinier Machine. Must be experienced. Excellent working conditions. Apply Allen Paper Mills, Inc., 400 Hoover Ave., Bloomfield, N. J. S-14

ONE MACHINE Midwestern fine paper mill has opening for Superintendent of Receiving, Finishing and Shipping. References required. Address 51-468 care Paper Trade Journal. S-14

WANTED — Machine Tenders and Back Tenders for corrugating medium and liner mill. Fourdinier and cylinder machines. Located in Western Pennsylvania; good working conditions; pleasant surroundings and very good labor relations. Call collect—Tarentum 1470. TARENTUM PRODUCTS CORPORATION, Tarentum, Pa. TF

SITUATIONS WANTED

PLANT MANAGER—Paper and Board and their conversion; wants challenging opportunity. Highly successful in organization; administration; labor relations and high level production. Presently employed. Address Box 51-463 care Paper Trade Journal. S-28

CHEMICAL ENGINEER—20 years technical and management experience, paper coating, coated abrasives, coating and converting machinery, resins and specialties. Desire technical or production position with established company. Address Box 51-471 care Paper Trade Journal. S-21

SITUATIONS WANTED

MANAGER OR SUPERINTENDENT—B.S. Degree, twenty four years in supervisory capacity manufacturing fine papers and specialties. Highly successful in organization, labor relations, maintenance, installation. Maximum production and quality at minimum cost. Motto —"It can be done." Excellent references. Address Box 51-445 care Paper Trade Journal. S-14

SALES REPRESENTATIVE—with twenty-five years as General Superintendent making fine papers. B. S. Degree. Personality and understanding of mill problems qualifies for representing firm supplying paper mills. Go anywhere, but prefer East. Best of references as to character, ability, and industry. Address Box 51-466 care Paper Trade Journal. S-28

PULP AND PAPER ENGINEER

30 years of practical experience in developing work. Kraft, soda and sulphite. Seeking connections. Able to remove 90% of the cooking liquor without any water dilution and the balance is removed with minimum dilution to complete washing. Will reduce 2000 lbs. of steam per ton of pulp in evaporators. Address box 51-470, care Paper Trade Journal. S-21

WANTED

WANTED

Small Paper Mill in East. One or two machines.

Write Box 51-454, c/o Paper Trade Journal.

S-21

WANTED

36" or 45" Beck Rotary Sheet Cutter with or without Electric Eye. Address Box 51-469, care Paper Trade Journal.

S-14

WANTED—W & P Shredders, Evaporators, Generators and Boilers, Slitters, Cutters, Hydraulic presses, Sheridan Presses, Dryers. Address Box 51-89 care Paper Trade Journal. TF

WANTED—Brightwood Box Machine, Shredders, Evaporators, Generators and Boilers, Slitters, Cutters, Hydraulic presses, Sheridan Presses, Dryers. Address Box 51-88 care Paper Trade Journal. TF

WANTED—Rewinder and Slitter 42" to 62". Full particulars to Box 51-457 care Paper Trade Journal. S-14

WANTED—1—145" to 150" seven to nine roll machine calender or rolls for the same. Also Press Parts or press rolls about the same width. Address Box 51-456 care Paper Trade Journal. S-21

WANTED—Sheeter 81" or wider, Layboy preferred. Address Box 51-465 care Paper Trade Journal. S-21

RATES FOR CLEARING HOUSE ADVERTISING

HELP WANTED—10c a word. Double rate for heavy face type. Minimum charge $3.50.

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If box number is used—70 cents additional.

Address replies to advertisements appearing under Box Numbers in care of PAPER TRADE JOURNAL, 15 West 47th Street, New York 19, N. Y.

FOR SALE

FOR SALE

KRAFT PAPER WANTED

30# and 40# preferred.
Immediate payment arranged via Bank Telegraphic transfer of funds.
ENTIRE TRIM MACHINE ACCEPTABLE.
Substantial quantities only—for export.
ALSO INTERESTED—large quantities 50 to 110# Kraft.
Principals only apply.
Address Box 51-353 care Paper Trade Journal S-14

FOR SALE—2—42" Moore & White Sheeters, one with layboy; 52" and 76" Cameron heavy duty Slitters; 76" two-drum Upright News Reel; 100" Dillon Sheeter with layboy; Industrial Paper Shredder, Thomas W. Hall Co., Inc., 120 West 42nd Street, New York 18. S-21

FOR SALE—64" Seybold Paper Cutter; 36" and 62" Cameron Slitter/Rewinder; 6' Brightwood; Int'nl. Folding Box Gluer; 30" and 44" Hartford Plates Die Cutter; 72" S & S Rotary Slitter/Creaser; Knowlton Spiral Tube Winder & Recutter like new; Complete Set-up Box Machines. Write for listings and prices. Address Box 51-467 care Paper Trade Journal. TF

FOR SALE—60" Kidder shear cut Slitter, type SH. Address Box 51-464 care Paper Trade Journal. S-21

Refill your beaters with bed plates and bars made by HOLYOKE BAR COMPANY, manufacturers of beater parts since 1899. All types bed plates and bars, including our own Patent Adjustable Bed Plate and Double Welded Steel In-Laid Bar. Write today for information and literature to HOLYOKE BAR COMPANY, Berkshire Street, Holyoke, Mass. S-38

PAPER COATING MACHINERY MANUFACTURERS — Waxing, Oiling, Carbon Laboratory Coating and Treating and Flat Room Measuring and Converting Machines. New improvement. THE MAYER MACHINE COMPANY, INC., 1313 Buffalo Road, Rochester, 11, N. Y. TF

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DOMESTIC AND FOREIGN CANADIAN OR AMERICAN ROLLS OR SHEETS
Any quantity—class are acceptable.
We will entertain any kind of confidential deal in behalf of our principals.
Address Box 51-357 care Paper Trade Journal. S-14

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191 PASSAIC STREET
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MACHINERY WANTED FOR OUTRIGHT PURCHASE

Paper Machines, Pulp and Paper Mill Machinery and Converting Equipment.

BEATERS
1—Ditts 700 lb. Iron Tub. Roll 44" face x 50" diameter.
1—Downingtown 1000 lb. Iron Tub. New roll 48" face x 48" diameter.

BELTING—NEW
37 feet 3" 15 ply Goodyear Rubber Belting.
100 feet 8" 4 ply Silver Bank Transmission belt.

CALENDER ROLLS
46 Chilled Iron Rolls—Assorted sizes.

CALENDER STACKS
1—3 roll—32".
1—3 roll—42". All rolls bored for steam.
1—Lobdell 6 roll 124" Calender Stack, with dusters and drives.
1—Farrel Birmingham 110" Calender Stack with dusters. 3 rolls bored for steam.

COMBINING MACHINE
1—Black Clawson 84" Combining Machine with 4—48" diameter and 1—36" diameter Dryers. Motor, pumps, tanks, etc. Complete.

CONVEYOR
1—13½ ft. long x 30" wide—with motor.

CYLINDER MOLDS
1—124" face x 36" diameter, with stainless steel shafts.

DRYERS
3—72" face x 48" diameter.
1—72" face x 48" diameter—with gear.
1—120" face x 19" diameter—Sticky Dryer.
1—48" face x 36" diameter.
1—120" face x 48" diameter, with bearings.
1—100" face x 48" diameter—with gears and bearings.
3—110" face x 42" diameter with bearings and gears.
1—112" face x 48" diameter.
1—120" face x 42" diameter Creping Dryer.
1—48" face x 36" diameter, with frame, gears and bearings.
10—60" face x 48" diameter, with gears, bearings and steam joints.
21—120" face x 42" diameter.
1—116" face x 48" diameter.
1—124" face x 42" diameter.
1—120" face x 36" diameter.

EXTRACTOR ROLLS
1—Downingtown Extractor Roll 120" face x 36" diameter. Anti friction bearings.

FILTERS
1—Oliver Vacuum Filter, Cylinder 9' face x 9' 6" diameter. Iron end bell.

FLAT SCREENS
2—2 plate Sandy Hill Roller Shoe with scrapers.
6—Kenyon 12 plate.
1—Sandy Hill 12 plate roller shoe.
3—Bagley & Sewall 6 plate, with scrapers and plates.
10—Sandy Hill 12 plate roller shoes.

HYDRAULIC PRESS
1—Thorpe 200 ton. Steam platens, 40"x40" with pump.

JORDANS
1—96 Missel, for motor drive.
1—Jones Majestic with base and couplings—42 Anaconda with base and couplings.
1—Jones Majestic Stainless Steel Fitted.
1—E. D. Jones Poxy, Anti friction bearing 5/16" stainless steel fillings, beaded plug.
2—E. D. Jones Poxy, 5/16" stainless steel fillings—beaded plugs.
1—Smith & Winchester Stainless with granite fillings.

MOTORS
1—Allis Chalmers 50 h.p. 440 v. 600 r.p.m.
1—Allis Chalmers 25 h.p. 440 v. 900 r.p.m.
28 others 440 v. motors from 7 h.p. to 15 h.p.

PULP EQUIPMENT
1—Bliss & Morrill #17 Pulpwood chipper.
1—Steel ball bearing Pulp Screen. Practically new. Used 6 months.
1—APPLEW Ball Bearing Pulp Screens—30 ton capacity.

PULPERS
1—72 Lamson.

PUMPS
41—Centrifugal Pumps, open & closed impellers. Direct connected or Belt Driven. Extended base for motor. Assorted capacities and heads. Most used less than one year. Also new Goulds Pumps.

REDUCERS
1—Link Belt 40 h.p. Ratio 2.5-1. 500 r.p.m.-227 r.p.m.

ROLLS—PRESS, COUCH, etc.
32—Press rolls, brass and rubber covered.
12—Couch rolls, brass and rubber covered.
250—Brass and steel carrying rolls.

SCREW PRESSES
1—Valley Voith Screw Press Size 2.

SHEETERS
1—Hamblet 124" Duplex Sheeter with maxim layboy—2 roll backstand—motor and starter.
1—Moore & White Simplex 110" Sheeter with slitter—counter Maxim layboy overlapping delivery. 4 roll backstand, motor and starter.
1—40" Kidder Reel Sheeter.
1—60" Dexter Slitter with 10 roll Back Stand.
1—Moore & White 81" with Erie Layboy and 10 roll backstand, with motor.

SHREDDERS
1—American 37" Hammermill, anti-friction bearings.
1—Layboy 28½" Knives—7 knife rotor—6 knife bed plate. Ball bearing.

SLITTERS AND WINDERS
1—Beloit 120" Paper Machine Slitter and Rewinder—32" rewind.
1—Hudson Sharp 98" Web roll slitter and rewinder.
1—Langston 40" sheet cut with motor and 28 sets of slitters.
1—Cameron 62" Model 0—60" rewind.
1—Missel 42".

STEAM TURBINES
1—De Laval 250 h.p. Initial pressure 165 p.s.i. Exhaust pressure 30 p.s.i. Complete with gear reducer.
1—De Laval Variable speed—670 h.p. at 180 gauge and 30 p.s.i. exhaust. Complete with gear reducer.

STOCK PUMPS
1—Shartle 10 x 24 Single Plunger Pump.

STOCK REGULATORS
3—Meritt Stock Regulators.

SUCTION PRESS ROLLS
1—Goudsmit 97" drilled face x 14" diameter.

THICKENER
1—Wandu Thickener with anti friction bearing. Cylinder 60" diameter x 120" face.

TOILET TISSUE PERFORATOR
1—Paper Converting Machine Co. Model 141 automatic 81" Perforator, slitter and Winder—with three motors—ball bearing.

VACUUM PUMPS
1—Nash H-5 Vacuum Pumps
1—Nash 24.
1—Nash 152.
1—Nash 22.

WATER FINISH UNIT
1—Valley Micronist Unit for water finish on paper—120" double.

WAXING MACHINES
1—60" Potdevin complete from 1st off to single roll rewind section.
1—60" Sandy—complete from 2 roll 1st off to single roll rewind.

WHY LIST YOUR EQUIPMENT? — WE WILL BUY IT.

FOR SALE

Cameron Slitters

1—84" Type 10.
1—62" Type 40-1AF.
1—42" and 1—52" Type 8-S.
1—62" Type 6.
1—42" Type 4.
1—52" Type 40-2A.
1—42" Type 40-1-AF.

OTHER SLITTERS

1—82" Langston Type-B.—Rewinds 80" diameter rolls.
1—60" Kidder Model 8-H-1 Shear Cut. Rewinds to 40".
1—60" Hammersly Score Cut.
1—42" Meisel Shear Cut.
1—60" & 1—40" Hammersley Score Cut.
1—30" & 1—40" Langston Type A Shear Cut S & R.
1—42" Langston Center Wind Duplex Shear Cut Slitter and Rewinder.
1—32" Hobbs Shear Cut, double rewind slitter and rewinder.

POWER PAPER CUTTERS

10—Seybold, 44" 20th Century, 40", 50" & 56" 62; 50" 102; 34", 44", 48" & 54" Holyoke; 50" Dayton.
3—Oswegos, 38", 44" and 57"; 1—Sheridan, 50"; 1—Dexter, 50"; 2—Acme, 32" and 46"; 1—S&W Under Cut 63".

MISCELLANEOUS MACHINES

3—Schultz Automatic Roll Machines. Take paper 12" to 24" wide. Roll lengths 12' to 150'.
1—60" Creping Machine. Has three 5' diameter dryers, complete unit.
1—64" Creping machine, complete with automatic Kohler system.
Several Die Presses, Seybold and Sheridan, various sizes.
1—20" Champlain 4 color Rotogravure Press.
1—26" Hudson-Sharp A-2 3 color Aniline Press. For roll to roll with NG 4-A Sheeter for variable length sheet work. Ten sets of cylinders from 13¾" to 28" repeat. AC motor equipment and metal drying hood.
1—New 24"-3 color, Roll to Roll Aniline Press.
1—48" Waldron Intgalio press for printing board in sheets.
1—48" Mayer Equalizer Waxing Machine, Type 48-EV. Two Coating Heads and three 16" diameter Cooling Drums.
1—62" Hammersly Squeeze Roll Waxing Machine.
1—84" Miami bi-type Waxing Machine, manufactured by Dilts Machine Works with 1 refrigerating unit size 4" x 4".
2—Potdevin Waxing Machines, 82" wide.
1—Paper Converting Machine Co.'s Model No. 218, three web, ¼ fold napkin machine with embossing attachment.
2—Brand new 91" Dietz, very latest type, friction rewind combination toilet and towel roll convertors. Automatic counters and stop motions.
1—45" Hamblet Rotary Sheet Cutter with Backstands.
1—64" Dillon Duplex Rotary Sheet Cutter.
1—94" Moore & White Duplex Rotary Sheet Cutter.
1—110" Model 20 Hamblet Duplex Rotary Sheet Cutter, slitting attachment, Erie automatic layboy and twelve roll backstands.
1—74" Hamblet Duplex Rotary Sheet Cutter, slitting attachment, 8 roll backstands, Moore & White layboy.
1—42" Hobbs Embosser, with Vickers 20 ton hydraulic pressure attachment.
1—45" Robinson Rotary Card Cutter.
1—85" nine roll Holyoke Super Calender stack with AC motor equipment.
1—46" Holyoke, 6 Roll, Stack of Super Calenders.
1—Staude, "Champion" folding and glueing machine.
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Lovejoy Flexible Coupling Co.
John Waldron Corp.

FLOORING, GRATING AND TREADS
The Goodyear Tire & Rubber Company
Norton Co.

FLOW BOXES, STAINLESS-CLAD
Lukens Steel Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works

FORK LIFT TRUCKS
Clark Equipment Company, Industrial Truck Division
Elwell Parker Elec. Co.
Towmotor Corp.

FORMATION TESTERS
Thwing-Albert Instrument Co.
Williams Apparatus Co., Inc.

FOURDRINIERS
Beloit Iron Works
Black Clawson Company
Farrington's Mfg. Co.
The Moore & White Co.
Pusey & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

FREENESS TESTERS
Testing Machines, Inc.
Williams Apparatus Co.

FURNACES
Hoffs Company, Inc.

GASKETS
The Goodyear Tire & Rubber Company

GEARS
The Bagley & Sewall Company
Black Clawson Company
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Frank W. Egan & Co.
Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Stroh Process Steel Co.
Valley Iron Works Co.
Westinghouse Electric Corp.
Western Gear Works

GRAPPLES
Blaw-Knox Company

GRAVITY FILTERS
Holyoke Machine Co.

GRINDERS
Carthage Machine Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Lobdell United Co.
Norton Company
Samuel C. Moore and Company
The Sandy Hill Iron & Brass Works

GRINDING WHEELS
Norton Company
Simonds Abrasive Co.

GUIDES
The Bagley & Sewall Company
Egan, Frank W., & Co.
Gilbert & Nash Co.
The Moore & White Co.
Mount Hope Machinery Co.
Rice Barton Corporation
John Waldron Corp.

GUMMING MACHINES
Dilts Machine Works
Egan, Frank W., & Co.
The Sandy Hill Iron & Brass Works

GUMS
National Starch Products, Inc.
Stein-Hall Co., Inc.

HEAT EXCHANGERS AND RECOVERY SYSTEMS
Fibre Making Processes, Inc.
Stickle Steam Specialties Co.
Westinghouse Electric Corp.

HEATING, VENTILATING & AIR CONDITIONING
The Appleton Machine Co.
E. D. Jones & Sons Co.
General Electric Co.
D. J. Murray Mfg. Co.
Red-Ray Mfg. Co., Inc.
Ross Engineering Corp., J. O.
Stickle Steam Specialties Co.
Valley Iron Works Co.

HOSE (Air, Water, Suction, etc.)
The Goodyear Tire & Rubber Company

HUMECTANTS
Aktivin Division, Heyden Chemical Corp.
Mogco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

IMPREGNANTS
American Cyanamid Company, Industrial Chemicals Division
B. F. Goodrich Chemical Co.

INDENTING MACHINES
Dilts Machine Works

INDUSTRIAL TRACTORS
Clark Equipment Company, Industrial Truck Division
Towmotor Corp.

INKOMETER
Thwing-Albert Instrument Co.

INSTRUMENTS, TESTING AND MEASURING
Brown Instrument Co.
Bunge Pulp & Paper Co.
Cambridge Instrument Co.
General Electric Company
W. & L. E. Gurley
B. F. Perkins & Son
Photovolt Corp.
Taylor Instrument Cos.
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Williams Apparatus Co.

JOINTS
The Bagley & Sewall Company
Beloit Iron Works
Johnson Corp.
Lovejoy Flexible Coupling Co.
Rice Barton Corporation
Shartle Bros. Mch. Co.
Appleton Machine Co.
Baker Brothers Mfg. Co.
E. D. Jones & Sons Co.
Shartle Bros. Mch. Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

KNIVES
Black Clawson Company
Dilts Machine Works, Inc.
Hamblet Machine Co.
Heppenstall Company
E. D. Jones & Sons Co.
The Moore & White Co.
Simonds Saw & Steel Co.
Taylor Stiles & Co.
Valley Iron Works Co.

KNOTTERS
Fibre Making Processes, Inc.

KRAFT WRAPPING PAPERS
Canadian Newsprint Supply Co.

LABORATORY CORRUGATOR
Thwing-Albert Instrument Co.

LABORATORY EQUIPMENT
Appleton Machine Co.
Bauer Brothers Co.
Bird Machine Company
Dilts Machine Works
W. & L. E. Gurley
Egan, Frank W., & Co.
E. D. Jones & Sons Co.
Taylor Instrument Companies
Testing Machines, Inc.
Valley Iron Works Co.
John Waldron Corp.
Williams Apparatus Co., Inc.

LAMINATING MACHINES
The Bagley & Sewall Company
Dilts Machine Works
Egan, Frank W., & Co.
Rice Barton Corporation
John Waldron Corp.

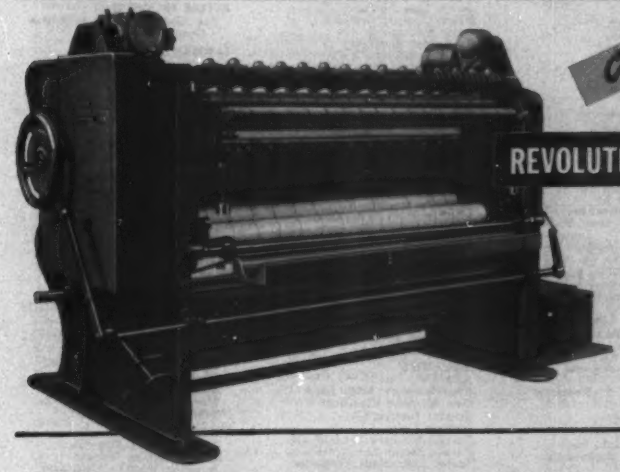
LAY BOYS
Dilts Machine Works
Gibbs-Brower Company, Inc.
Hamblet Machine Co.
Moore & White Co.

LIFT TRUCKS
Clark Equipment Company, Industrial Truck Division

LINTER COTTON
Alpha Cellulose Corp.
Railway Supply & Mfg. Co.

LINTER PULP
Alpha Cellulose Corp.

LUBRICANTS
Gulf Refining Co.
Sinclair Refining Co.



Cuts Perforates Slits

REVOLUTIONARY, NEW ROLL WINDER

Counts *Automatically*

WITH 25-50% GREATER PRODUCTION SPEED

- SHARP, CLEAN EDGES
- NO LINT OR FUZZ
- 100% ACCURATE COUNT

THERE'S no lost motion with the 60-B new, *continuous* toilet roll winder. Operator simply places uncut core on shaft at number one station and removes completed rolls which have been cut, perforated and accurately sheet counted, from the number two station. After displacing rolls, operation is repeated. Each full cycle produces a minimum of 10 standard 4½" rolls on a 45" machine or 18 similar rolls on an 81" machine. Winder is also designed for roll towel and other paper products production. Simplified mechanical operation assures smooth running with a minimum of wear on all running parts. This same steady, even motion produces rolls of uniform appearance and bulk. Write for further information and complete specifications.

HUDSON-SHARP
MACHINE CO • GREEN BAY • WIS
Manufacturers of
Printers, Embossers, Folders, Interfolders, Winders, Combinations, Wrapping Machines, Core Winders, Packaging Presses, Creepers and Napkins, Toilet Tissue and Paper Towel Units

Socony-Vacuum Oil Co.
Sun Oil Company
The Texas Company
Tide Water Associated Oil Co.

MAGAZINE REELS
Dilts Machine Works (Kohler Systems)

MATERIALS HANDLING
Clark Equipment Company
Industrial Truck Division
Cleveland Crane & Engrg. Co.
Dilts Machine Works
Jeffrey Mfg. Co.
Shartle Bros. Mch. Co.
Stephens-Adamson Mfg. Co.
The Wellman Engrg. Co.

METAL TIRES
Stroh Process Steel Co.

MICROMETERS & CALIPERS
Farrel-Birmingham Co.
Lobdell Co.
Stephens-Adamson Mfg. Co.
Testing Machines, Inc.

MICRO-CRYSTALLINE WAXES
Bareco Oil Co.
Bunge Pulp & Paper Co.
Moore & Munger
Sun Oil Company

MOISTURE CONTENT CONTROL
Cambridge Instrument Co.
Bickle Steam Specialties Co.
Williams Apparatus Co., Inc.

MOTORS AND GENERATORS
Allis-Chalmers Mfg. Co.
Fairbanks, Morse & Co.
General Electric Company
Reliance Electric & Engrg. Co.

NEWSPRINT
Bunge Pulp & Paper Co.
Canadian Newsprint Supply Co.

NICKEL AND NICKEL ALLOYS
The International Nickel Co.

NOZZLES
Spray Engrg. Co.

PACKING BOXES
Clark Equipment Company
Industrial Truck Division

PAPER MACHINE DRIVES
The Bagley & Sewall Company
Manchester Machine Co.
Rice Barton Corporation

PAPER MACHINES
The Bagley & Sewall Company
Beloit Iron Works
Bagley & Sewall Co.
Black Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Lakewerid
Moore & White Co.
Pusey & Jones Corp.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

PAPER MACHINE SLICES
Black Clawson Company
E. D. Jones & Sons Co.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.

PAPER TUBE MACHINERY
Dietz Machine Works
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson Sharp Machine Co.
Jagenberg-Werke Akt. Ges.
Langston Co., Samuel M.

PARAFFINE WAXES
Moore & Munger
Sun Oil Company

PARAFFIN WAX EMULSIONS
Nopco Chemical Co.

PASTING MACHINES
Beloit Iron Works
Black Clawson Company
Dilts Machine Wks.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Murray, D. J., Mfg. Co.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

PEBBLE MILLS
F. L. Smidth & Co.

PERFORATED METAL
Allis-Chalmers Mfg. Co.

pH METERS
Cambridge Instrument Co.
Thwing-Albert Instrument Co.

PIPE
Armco Drainage & Metal Products, Inc.
Babcock & Wilcox Co.
Crane Company
Grinnell Company
Michigan Steel Casting Co.
National Tube Co.
Walworth Company

PIPE FITTINGS
Armco Drainage & Metal Products, Inc.
Crane Company
Grinnell Company
Michigan Steel Casting Co.
Walworth Co.

PITCH CONTROL
American Cyanamid Company
Industrial Chemicals Division
General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.

PLASTICIZERS
American Cyanamid Company
Industrial Chemicals Division
Aktivin Division, Heyden Chemical Corp.
B. F. Goodrich Chemical Co.
Naugatuck Chemical
Division of U. S. Rubber Co.
Nopco Chemical Co.

PLATERS
Gibbs-Brower Company, Inc.
Perkins & Son, Inc., H. F.

PLATES
Armco Steel Corp.
Babcock & Wilcox Co.
J. O. Ross Engrg. Corp.
Lukenweld Division
Lukens Steel Company
Timken Roller Bearing Co.

PLUGS
The Appleton Machine Co.
Black Clawson Company
E. D. Jones & Sons Co.
Shartle Brothers Machine Co.

POPE TYPE REELS
Egan, Frank W., & Co.
Manchester Machine Co.
Rice Barton Corporation

PRECISION SAMPLE CUTTER
Testing Machines, Inc.
Thwing-Albert Instrument Co.

PRESERVATIVES
E. I. du Pont de Nemours & Co.
General Dyestuff Corp.

PRESS ROLLS
Beloit Iron Works
Rice Barton Corporation

PRESSURE FILTERS
Holyoke Machine Co.

PRESSURE VESSELS
Chicago Bridge & Iron Co.
Combustion Engineering-Superheater, Inc.

PRESSES
Black Clawson Company
Dietz Machine Works
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson-Sharp Mch. Co.
The Moore & White Co.
Potdevin Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.
Waldron Corp., John
H. G. Weber & Co., Inc.
Williams Apparatus Co.

PULLEYS
Lovejoy Flexible Coupling Co.
Rice Barton Corporation

PULP CLASSIFIER
The Bauer Bros. Co.
Thwing-Albert Instrument Co.

PULP CLEANERS
Nichols Engrg. & Research Corp.

PULP STOCK VALVES
Crane Company
Record Pdy. & Mach. Co.
Shartle Brothers Machine Co.

PULPERS
Apmew, Inc.
Bauer Brothers Co.
Dilts Machine Works
E. D. Jones & Sons Co.
Morden Machines Co.
Shartle Brothers Machine Co.

PULPS
Alpha Cellulose Corp.
Brown Company
Bunge Pulp & Paper Co.
Gottesman & Co., Inc.
Lyddon & Co. (America), Inc.
Parsons & Whittemore, Inc.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
Pulp and Paper Trading Co.
Rentgouche Co., Ltd.

PULPSTONES
Norton Company

PULP TESTERS
Paper and Pulp Testing Laboratories
Williams Apparatus Co., Inc.

PULVERIZING MILLS
Combustion Engineering-Superheater, Inc.
Jeffrey Mfg. Co.
F. L. Smidth & Co.

PUMPS
Allis-Chalmers Mfg. Co.
Apmew, Inc.
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Buffalo Pumps, Inc.
Byron Jackson Co.
DeLaval Steam Turbine Co.
Downingtown Mfg. Co.
Fairbanks, Morse & Co.
Gibbs-Brower Company, Inc.
Johnson Corp.
Moore & White Co.
Nash Engineering Co.
Roots Connersville Blower Corp.
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

RADIANT BURNERS
Red-Ray Mfg. Co., Inc.

RAG COOKING PROCESSES
The Kingsley Chemical Company
General Dyestuff Corp.
Rohm & Haas Co.

RAG CUTTERS
Gibbs-Brower Company, Inc.
B. F. Perkins & Son, Inc.
Taylor-Stiles & Co.

RECOVERY SYSTEMS
Babcock & Wilcox Co.
Chicago Bridge & Iron Co.
Combustion Engineering-Superheater, Inc.
Moore & White Co.
D. J. Murray Mfg. Co.
Pusey & Jones Corp.
Ross Engineering Corp., J. O.
Valley Iron Works Co.

REELS
The Appleton Machine Co.
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
Downingtown Mfg. Co.
Hudson-Sharp Mch. Co.
Moore & White Co.
Rice Barton Corporation
Rodney Hunt Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg. Co.

REFINERS
Appleton Machine Co.
Bahr Brothers Mfg. Co.
Bauer Brothers Co.
Dilts Machine Works
Gibbs-Brower Company, Inc.
E. D. Jones & Sons Co.
Morden Machines Co.
Murray, D. J., Mfg. Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Sprout Waldron & Co., Inc.
Sutherland Rodney Corp.
Valley Iron Works

REGULATORS
APMEW, Inc.
Allis-Chalmers Mfg. Co.
Bird Machine Company
General Electric Co.
Johnson Corp.
Shartle Brothers Machine Co.
Bickle Steam Specialties Co.
Taylor Instrument Companies

RESINS
American Cyanamid Company, Plastics & Resins Division
The Dow Chemical Company
B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Hercules Powder Co.
Monsanto Chemical Company
Naugatuck Chemical
Division of U. S. Rubber Co.
Nopco Chemical Co.
Plaskon Division,
Libbey-Owens-Ford Glass Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co., Resinous Products Div.

ROLLS
Appleton Machine Co.
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
Frank W. Egan & Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Holyoke Machine Co.
Lobdell United Co.
Edward J. McBride Co., Inc.
The Moore & White Co.
D. J. Murray Mfg. Co.
Perkins, B. F., & Sons Co.
Pusey & Jones Corp.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
U. S. Rubber Co.
Valley Iron Works Co.
Waldron Corp., John
Wheeler Reil Co.

ROLL COVERS
The Goodyear Tire & Rubber Company

ROLL HANDLING EQUIPMENT
Dilts Machine Works (Kohler Systems)

ROLL STANDS
Cameron Machine Co.
Dilts Machine Works (Kohler Systems)
Frank W. Egan & Co.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
John Waldron Corp.
H. G. Weber & Co., Inc.

ROPE CARRIERS
Black Clawson Co.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works

ROTARY KILNS
F. L. Smidth & Co.

ROTARY STEAM JOINTS
Johnson Corp.
The Moore & White Co.
Rice Barton Corporation
Shartle Bros. Mch. Co.

RUBBER PRODUCTS
The Goodyear Tire & Rubber Company

SATURANTS
B. F. Goodrich Chemical Co.

SATURATING MACHINES
Dilts Machine Works
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

SAVEALLS
Bird Machine Company
Chicago Bridge & Iron Co.

SAWS
Simonds Saw & Steel Co.

SCALES
Fairbanks, Morse & Co.
Merrick Scale Mfg. Co.
Testing Machines, Inc.

SCREEN PLATES
Bird Machine Company
Plattsburg Screen Plate Co.
Magnus Metal Corp.
Morey Paper Mill Supply Co.
Testing Machines, Inc.

SCREENS
Allis-Chalmers Mfg. Co.
Appleton Wire Works
Appleton Machine Company
The Bagley & Sewall Company
Bird Machine Company
Carthage Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Fibre Making Processes, Inc.
Gibbs-Brower Company, Inc.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Stephens-Adamson Mfg. Co.
Valley Iron Works Co.

SHEET MACHINES
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Valley Iron Works Co.
Williams Apparatus Co., Inc.

SHEETERS
Jagenberg-Werke Akt. Ges.

SHOWER PIPES
Bird Machine Company
Downingtown Mfg. Co.
Moore & White Co.
Sandusky Fdy. & Mch. Co.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

SHREDDERS
Bauer Brothers Co.
Carthage Machine Co.
Gibbs-Brower Company, Inc.
Jeffrey Mfg. Co.

SILOS, STORAGE
The Marietta Concrete Corp.

SIZE PRESSES
Manchester Machine Co.
Rice Barton Corporation

SIZING
American Cyanamid Company
Industrial Chemicals Division
The Dow Chemical Company
du Pont, E. I., de Nemours & Co.
Glidden Company
Hercules Powder Co.
The Hubinger Co.
Monsanto Chemical Company
National Aluminate Corp.
Mopco Chemical Co.
Stein-Hall Co., Inc.
Wyandotte Chemicals Corp., Michigan Alkali Div.

SIZING TESTER
W. & L. E. Gurley
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Williams Apparatus Co., Inc.

SLIME CONTROL
The Dow Chemical Company
E. I. du Pont de Nemours & Co.
General Dyestuff Corp.
Monsanto Chemical Co.
National Aluminate Corp.
Rohm & Haas Co.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

SLITTERS
The Bagley & Sewall Company
Block Clawson Company
Cameron Machine Co.
Carthage Machine Co.
Clark-Aiken Co.
Dietz Machine Works
Diltz Machine Works
Downingtown Mfg. Co.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Graphic Arts International Corp.
Thomas W. Hall Co., Inc.
Hamblet Machine Co.
Hudson-Sharp Mch. Co.
Jagenberg-Werke Akt. Ges.
Langston Co., Samuel M.
Moore & White Co.
D. J. Murray Mfg. Co.
Potdevin Machine Co.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

SMOKE STACKS
Chicago Bridge & Iron Co.

SOFTNESS-STIFFNESS TESTER
W. & L. E. Gurley
Testing Machines, Inc.
Thwing-Albert Instrument Co.

SOLUBLE OILS
American Cyanamid Company, Industrial Chemicals Division
General Dyestuff Corp.
Nopco Chemical Co.

SPECIAL MACHINERY
Diltz Machine Works
Egan, Frank W., & Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
John Waldron Corp.

SPLICING TISSUE
Bunge Pulp & Paper Co.
Williams-Gray Co.

STAINLESS STEEL
Armco Steel Corp.
Michigan Steel Casting Co.
U. S. Steel Corp.

STARCH
A. M. Meincke & Son, Inc.
Cloning Foods, Inc.
The Hubinger Co.
National Starch Products Inc.
Stein-Hall Co., Inc.

STEAM JOINTS
The Moore & White Co.
Rice Barton Corporation
Shartle Bros. Mch. Co.

STEAM SPECIALTIES
Babcock & Wilcox Co.
Combustion Engrg. Co., Inc.
Johnson Corp.
Stickle Steam Specialties Co.

STEEL
Armco Steel Corp.
Carnegie Illinois Steel Co.
Lukens Steel Company
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
U. S. Steel Corp.

STEEL CLAD
Babcock & Wilcox Co.
Lukens Steel Company

STEEL TANKS
Chicago Bridge & Iron Co.
The Sandy Hill Iron & Brass Works

STRETCH TESTER
Thwing-Albert Instrument Co.

STUFF CHESTS
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
Rice Barton Corporation
Shartle Brothers Machine Co.
Valley Iron Works Co.

SUCTION BOXES
Black Clawson Company
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

SUCTION ROLLS
Beloit Iron Works

SULPHITE SPECIALTIES
Canadian Newsprint Supply Co.

SULPHUR
Texas Gulf Sulphur Co.

SULPHUR BURNERS
Valley Iron Works Co.

SULPHUR DIOXIDE
American Cyanamid Company, Calco Chemical Div.
Ansul Chemical Co.
Virginia Smelting Co.

SUPERCALENDERS
The Appleton Machine Co.
R. F. Perkins & Son, Inc.

SYNTHETIC LATICES
American Cyanamid Company, Industrial Chemicals Division
B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.

TAKE OFF UNITS
Diltz Machine Works (Kohler Systems)

TALC
American Cyanamid Company, Industrial Chemicals Division
Vanderbilt Co., R. T.

TANKS
Chicago Bridge & Iron Co.
Kalamazoo Tank & Silo Co.
The Marietta Concrete Corp.
R. F. Perkins & Sons, Inc.
J. O. Ross Engrg. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

TEARING TESTERS
Thwing-Albert Instrument Co.
Testing Machines, Inc.

TENSILE TESTERS
Bunge Pulp & Paper Co.
Thwing-Albert Instrument Co.
R. F. Perkins & Son, Inc.
Testing Machines, Inc.
Nopco Chemical Co.

THICKENERS, DECKERS AND SAVEALLS
The Appleton Machine Co.
Bird Machine Company
Carthage Machine Co.
Chicago Bridge & Iron Co.
Diltz Machine Works
Downingtown Mfg. Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

TITANIUM
American Cyanamid Co., Calco Chemical Div.
E. I. du Pont de Nemours & Co.
Titanium Pigment Co.
R. T. Vanderbilt Co.

TOOLS
Walworth Company

TRACTORS AND TRUCKS
Clark Equip. Co. of Industrial Truck Div.
Elwell Parker Elec. Co.
Towmotor Corp.

TRANSMISSIONS
Alexander Bros. Belting Co.
Dodge Mfg. Corp.
Jeffrey Mfg. Co.
Link Belt Company
Lovejoy Flexible Coupling Co.
Stephens-Adamson Mfg. Co.

TRAPS
Crane Co.
Johnson Corporation
Shartle Bros. Mch. Co.
Stickle Steam Specialties Co.

TUBE MILLS
F. L. Smidth & Co.

TUBES
Babcock & Wilcox Co.
National Tube Co.

TUBING MACHINES
Diltz Machine Works

TUBING, MECHANICAL
National Tube Co.

TUBS
Shartle Brothers Machine Co.
Valley Iron Works Co.

TURBINES
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
General Electric Company

UNWINDERS
Diltz Machine Works (Kohler Systems)
Egan, Frank W., & Co.
Rice Barton Corporation
John Waldron Corp.

USED EQUIPMENT
Gibbs-Brower Co.
Thomas W. Hall Co.
J. J. Ross Company
Ross Paper Machy. Corp.
Shartle Brothers Machine Co.

V-BELTS
Lovejoy Flexible Coupling Co.

VALVES
The Bagley & Sewall Company
Crane Company
Diltz Machine Works
Fabri Valve Co. of America
E. D. Jones & Sons Co.
Magnus Metal Corp.
D. J. Murray Mfg. Co.
William Powell Co.
Record Fdy. & Mch. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Stickle Steam Specialties Co.
Valley Iron Works Co.
Walworth Company

VATS
Beloit Iron Works
Rice Barton Corporation

WASHERS
The Bagley & Sewall Company
Bird Machine Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
E. D. Jones & Sons Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

WASTE TREATING EQUIPMENT
Hungerford & Terry, Inc.
Jeffrey Mfg. Co.

WATER CONDITIONING
Calgon, Inc.
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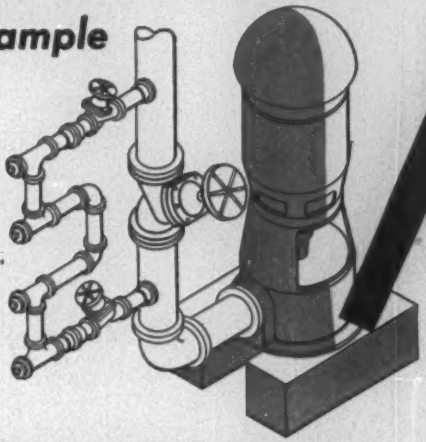

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Timken bearings on plug shafts are a powerful extra plus for jordan engines. They carry the heavy loads on the plug and help prevent any deflection or end-movement which might upset the minute adjustment between plug and shell. Stock is refined more effectively. Cost of repair and maintenance on the machine is minimized.

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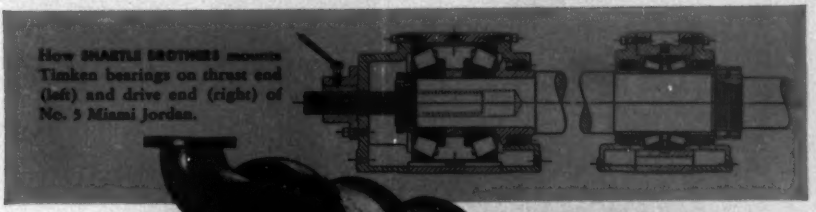
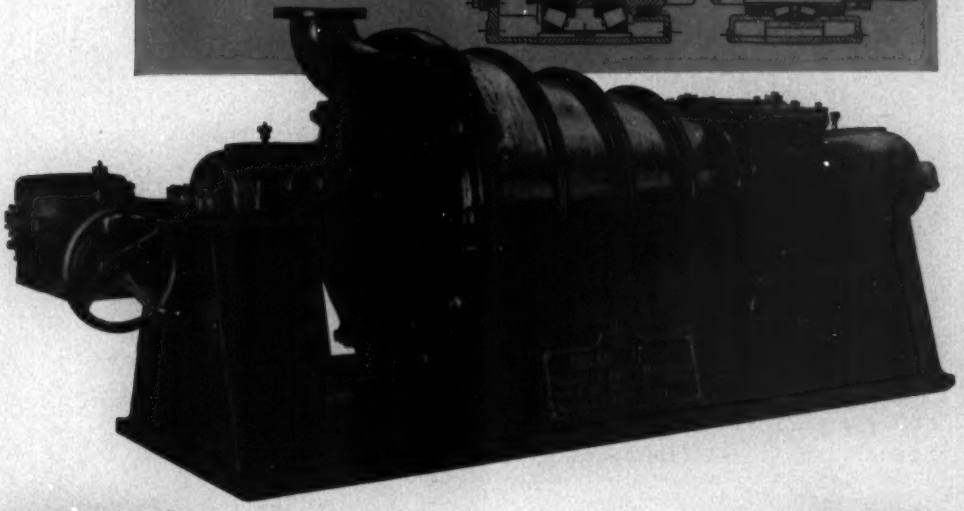
This symbol on a product means its bearings are the best.



How SHARTLE BROTHERS mounts Timken bearings on thrust end (left) and drive end (right) of No. 5 Miami Jordan.



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